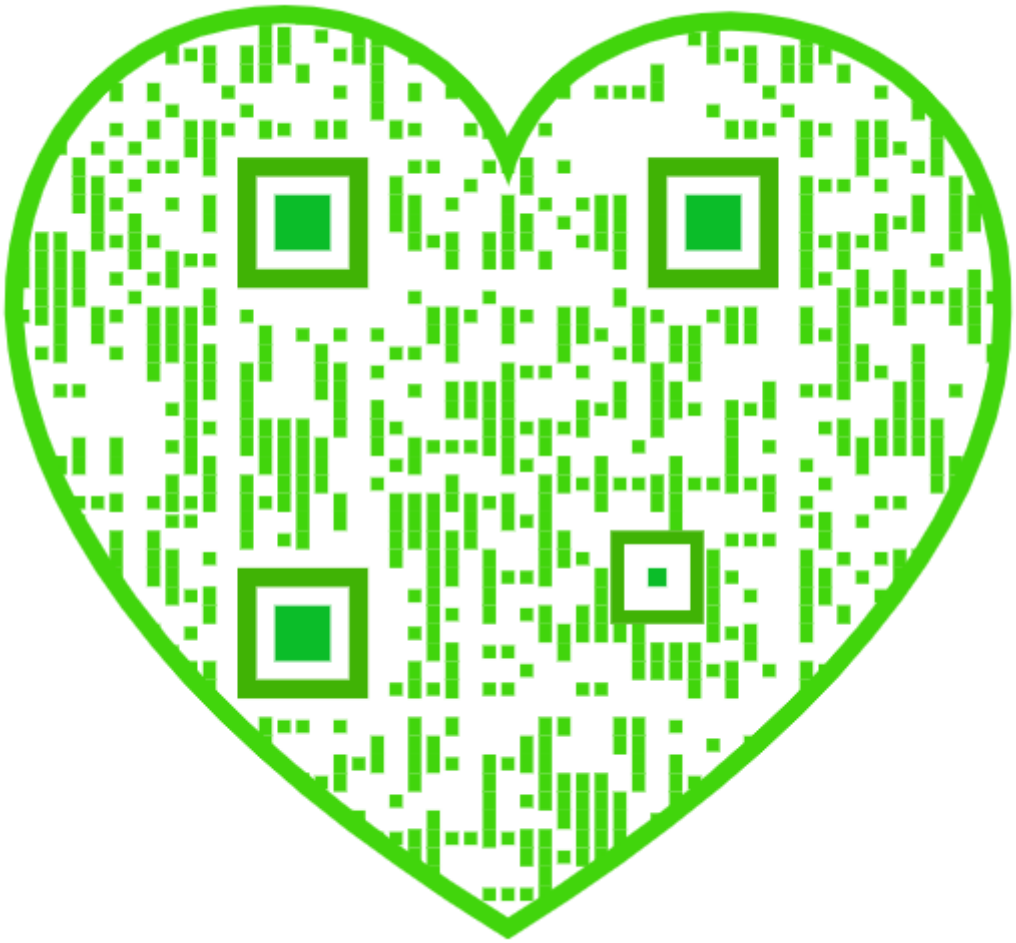

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THE ARCHITECT AND ENGINEER

of California

Pacific Coast States

AUGUST 1910

State Normal School at San Jose a Triumph in Concrete Construction

Some Recent Examples of Reinforced Concrete Bridge Work

Architect Henry Hornbostel Describes Oakland's Splendid New City Hall

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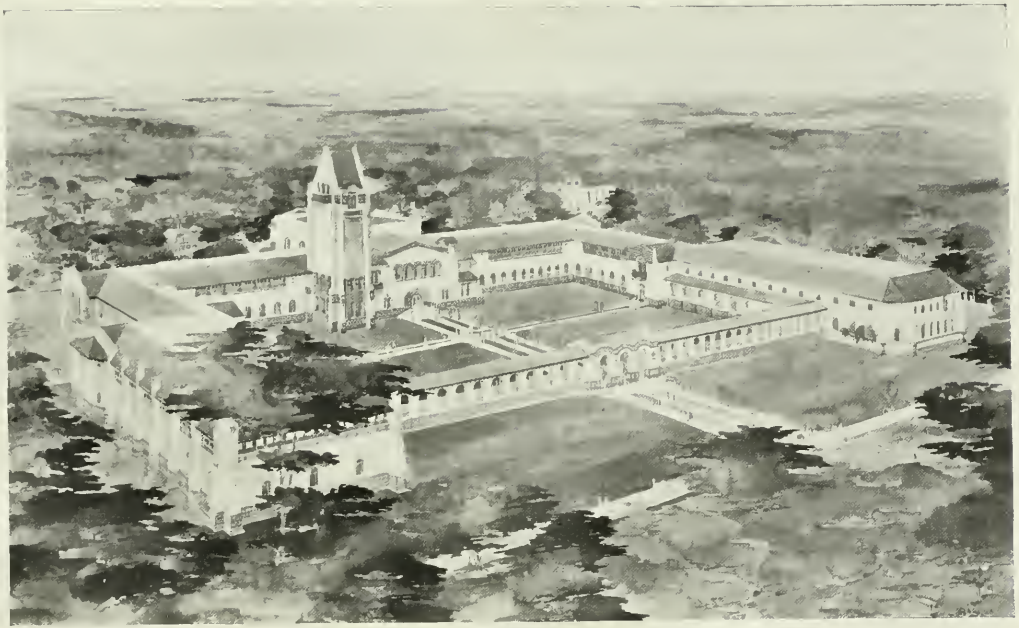

Bird's-eye View of California State Normal School, San Jose, Cal.
State Engineering Department, Architects

Walter Parker, Del

Frontispiece
The Architect and Engineer of California
August, 1910

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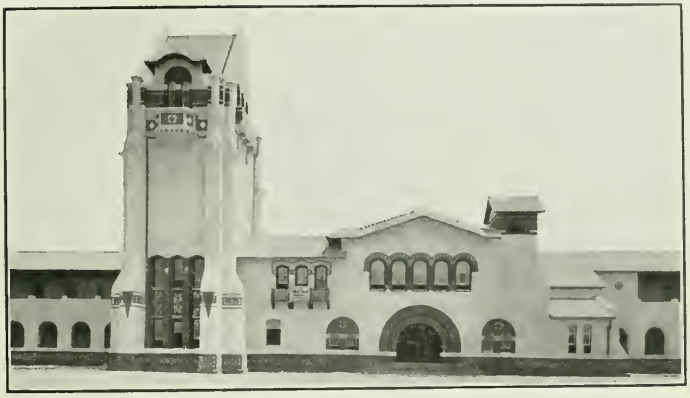


View from Patio Looking East, California State Normal School, San Jose, Cal.

State Normal School at San Jose

The Largest Concrete Building of its Kind in the World

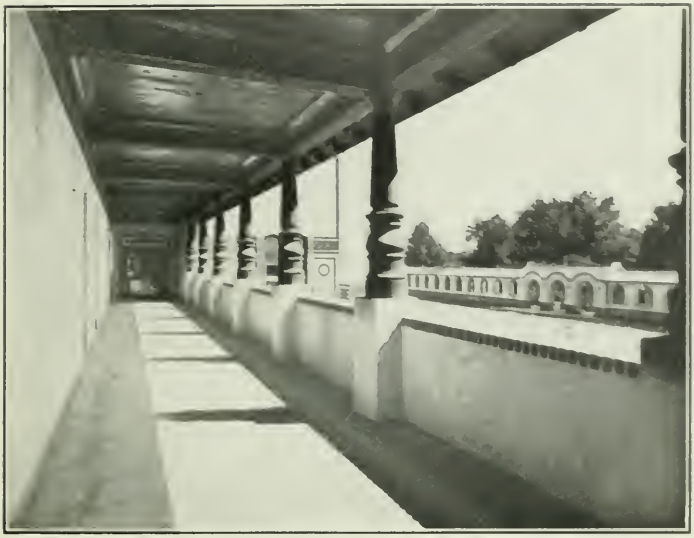
THE California State Normal School, just completed at San Jose, is said to be the largest reinforced concrete school building, in ground area, in the world. Because of its immense proportions and unusual exterior treatment it is attracting world-wide attention.

The decorations of the structure are unique, and demonstrate the possibilities of ornamentation of all-concrete structures at comparatively small expense. Red pressed brick and Faience tile have been worked into simple, pleasing patterns to offset the monotony of somber, gray walls of concrete.

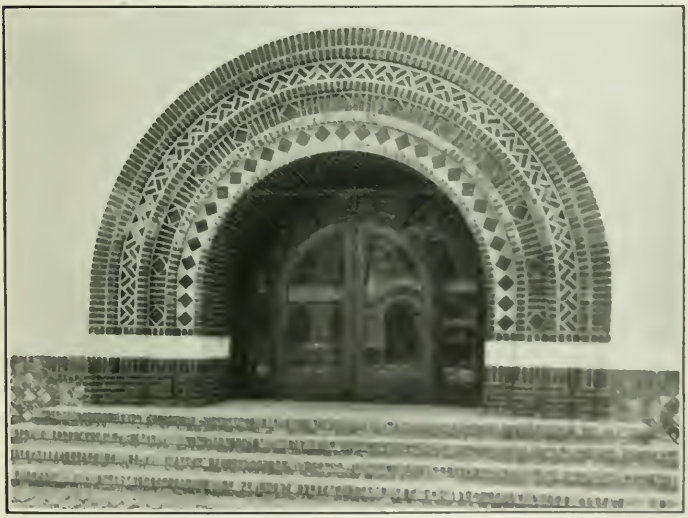
The building is the only one of its kind in California, if indeed, it has a duplicate anywhere in the world. It covers a ground area of 246 by 472 feet, and is two stories high. There is an imposing tower equivalent to

Arcade, Showing Massive Concrete Arches

ing Southeast Toward the Tower, from Arcade



Looking West from Second Story Open Corridor



Detail of Entrance, Showing Artistic Treatment of Brick and Facing the Arch

Tower and Main Building, State Normal School, San Jose, Cal.

five stories. The architecture is a combination of the so-called Mission and Spanish, with suggestions of the Moorish and Gothic, the latter being quite a little in evidence in the tower treatment.

From an artistic standpoint, nothing has thus far been developed in California to equal it. We are speaking now of a public building built entirely of reinforced concrete. The design was turned out by the State engineer and architect, Messrs. Nat Ellery and W. D. Coates, but the actual development of the plan was left to a young French student named Demarri, now in the employ of Architects D. H. Burnham & Co., of Chicago.

It was the desire of the State authorities to have a school building that would be both fire and quake proof; at the same time the style of architecture was to be in keeping with the country and climate, and finally the structure must be made attractive. It must have color and life to it, outside as well as inside. That all this has been accomplished, one need only glance at the photograph illustrations to be convinced.

The building is built in the shape of a rectangle, broken up slightly with pavilions and buttresses. It is absolutely monolithic. The concrete was poured by gravity from three high towers, 43,840 sacks of cement being used in a mixture of one to six (three parts river gravel and three parts crushed stone). The Lug bar was used for reinforcement, the tonnage amounting to something over 200 tons, besides 116,000 feet of wire fabric. More than 1,300,000 feet of lumber was used. This includes the cribbing, forms and interior finish. Forms were required for about 365,000 square feet of concrete. The exterior of the rough walls are covered with a pebble dash of Medusa white Portland cement. The interior of the corridors is treated with the stipple finish, while the interior of the building has the hard-wall sand finish.

The exterior color scheme is gray, red and green, red clay tile of a uniform size and color being used for the roof, which harmonizes nicely with the red brick and Faience tile inlays. The inlaid work is used largely to decorate the entrances and towers. There are 20,076 square feet of inlay.

In the center of the building is a large quadrangle which will be laid out into concrete walks and grass plots. Extending entirely around the quadrangle, on both floors, are open arcades, affording comfortable passage from one classroom to another. The main vestibule floor is laid in Welsh quarry tile, while the corridor floors are of colored cement. All classroom floors, of concrete, are covered with 2¼-inch maple. The wood finish is Oregon pine, stained and polished. There are a total of 155 rooms, including all inclosures requiring both door and window. There are 38 large classrooms, the average size of which is 24 by 32 feet. The library is the largest room in the building, and is a gem in itself. It is two stories high, 60 by 97 feet, and void of columns to obstruct valuable space and light. The ceiling is done in ornamental plaster, with panels and Corinthian pilasters in staff and stucco. There are accommodations for 40,000 volumes, the equipment including 22 double steel stacks, each one 14 feet long, and 44 reading tables.

Special attention has been given to the lighting features of the building, the light invariably falling over the left shoulder. The building is fully equipped with gas and electric lighting facilities for use on dark days or at night. Every room has a private telephone connection. The building is heated by the plenium fan and exhaust system, the steam being generated in a boiler plant built some distance away. The heat is brought into the

Progress Work, California State Normal School

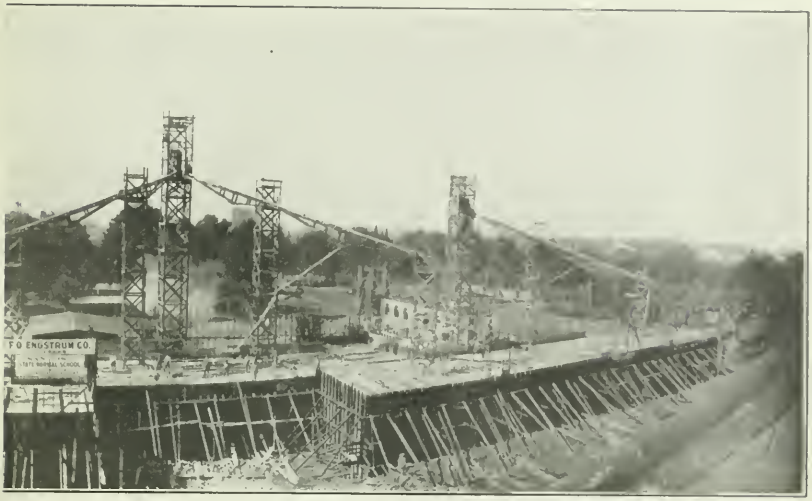
main building through a concrete tunnel, and is then distributed into the several rooms in galvanized iron ducts.

Erected at a total cost to the State of $272,000, or a little less than 16½ cents per cubic foot, the building is unquestionably the best bargain California has ever been fortunate enough to make. The F. O. Engstrum Company has built many public structures in the past four years, but none quite as good as the Normal School for the money. Keen competition, of course, had a good deal to do with the low figure; likewise a desire on the part of the successful contractors to make it their banner job. Construction work covered a period of little more than a year, and was conducted under the personal supervision of Mr. F. O. Engstrum, president of the company.

* * *

Radical Changes in Wall Coverings

THERE has been an immense change within the last few years in the style of wall paper and in the quality of the color value, says a writer in Suburban Life. A few years ago dark greens and reds were all the rage for living-rooms. Red is difficult to live with; it is too assertive for large spaces, as it absorbs the light, and those who are sensitive find it unrestful and too exhilarating. Red is beautiful in small quantities or where a touch of bright color is needed. A quantity of white woodwork, bookcases and fitments tend to obviate this feeling; but it is better in the beginning to have something less assertive for the atmosphere of the room. There is a beautiful shade of Pompeian red that has something of an old rose quality; it can sometimes be used with good results, but even this shade requires considerable woodwork and wall fitments to make it successful. Pale, soft greens, browns and wood colors, soft grays and pale, cool colors of every description are preferred today.

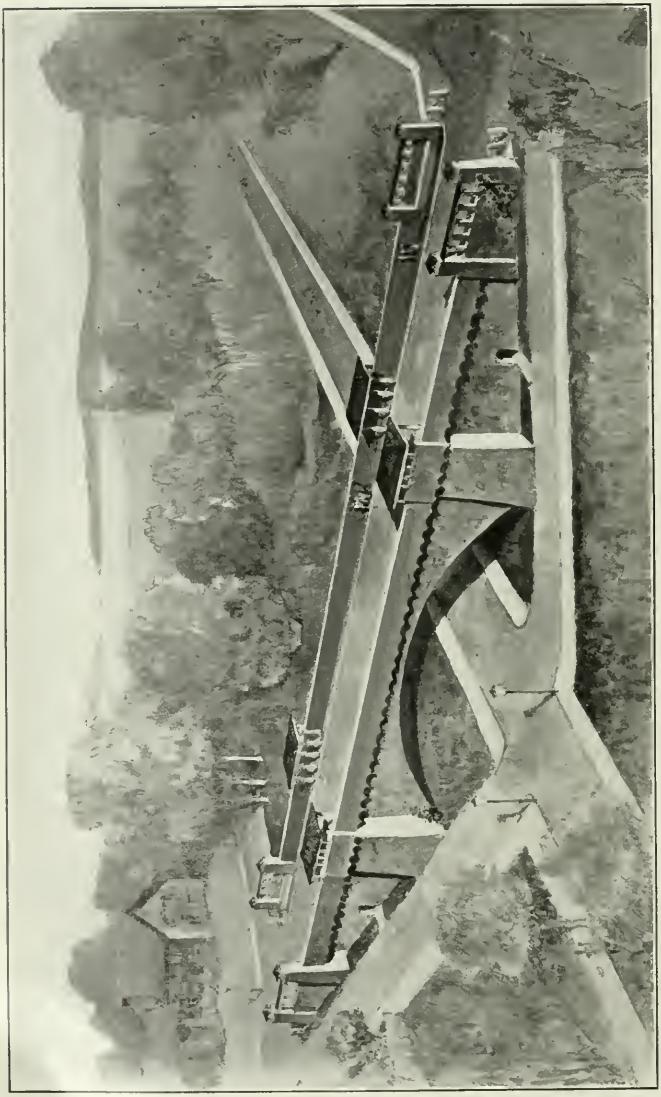


Showing Gravity Towers Used for Pouring the Concrete

Perhaps the most effective treatment for the wall is a sufficiency of woodwork, wainscots and paneled walls. Ceiling beams and built-in furniture are a part of the house itself, and serve to draw it closer to the needs of daily life.

Figured papers are not so much used today as they were. People are apt to tire of the pattern, and then a change is necessary, not because the walls are soiled, but because the craze for novelty and change tends to make the home-maker turn everything "topsy-turvy," to have a new scheme in the room. Tapestry papers have so long been used for the dining-room that, although they are not the mode today, there is something so charming about their soft, mellow coloring that there will always be found plenty of people who choose them. They are still used above the bookcases and wainscot in living rooms, and seem to be well suited, because of their cozy appearance for such rooms. A new kind of paper is seen this season in modern dining-rooms; the background is variegated and has a fabric effect; it comes in pale tones. Each length of paper terminates with a crown frieze. These friezes are thoroughly Dutch in character, and are of fruit motifs; walls treated with these papers are most beautiful. The paper costs $1.50 a roll, two crowns coming in each roll.

The parlor is the most difficult room in the house to deal with. If used for only formal occasions and as a reception room, it can be treated in a formal way; but, if it is used for every-day life, the walls should be treated like those of a living-room. A parlor can be decorated differently from the other rooms, white paint generally being preferred, even if the woodwork all over the house is stained, or of dark natural tone. A thing of the past are the parish parlors of a few years ago when the walls were paneled in cheap paper, and divided by narrow molding in imitation of French walls. If a panel parlor is desired, the walls can be covered with white paint, and real wooden moldings laid on the walls, dividing them into correct sections.



Reinforced Concrete Bridge, Piedmont, Cal.

W. P. Day, Engineer in Charge of Construction

Albert Farr, Architect

John B. Leonard, Engineer

Reinforced Concrete Bridges, with Specific Descriptions

By W. P. DAY, C. E.

DURING the last few years the proportion of concrete bridges that have been built, in comparison with steel and combination bridges, has materially advanced, and the success attendant upon their use bids fair to increase the proportion. Traveling the county highways in this State a few years ago, it was the exception rather than the rule to cross a bridge made entirely of concrete and reinforcing steel. Everybody is familiar with the inadequately braced pony trusses fabricated of steel and timber, and their unsound condition after a few years of usage and of exposure to the elements. In point of years of service the steel bridge is surely an improvement upon the combination, but in order to make the steel bridge of reasonably long life it must be carefully attended to. Unless painted at comparatively frequent intervals, the steel corrodes; the timber floor is subject to great wear and consequent renewal. The natural result, after the general characteristics of reinforced concrete became known, was the rapid recognition of its possibilities in bridge design.

As opposed to the necessary wear and final uselessness of other types, the reinforced concrete bridge, if properly designed and executed, is practically an everlasting structure, unless failure of the foundations occurs, a condition which no type can withstand. Once constructed, this type requires no attention whatever. All things being equal, a concrete bridge is more expensive than one of steel in so far as initial cost is concerned, but in such a comparison one should consider maintenance and renewal charges, with neither of which can the former be charged. As a business investment (and it is in this light that the proposition should be considered), the concrete bridge stands pre-eminent.

A steel bridge with a solid floor of concrete does away with the necessity for floor renewal and leaves the care of the trusses only. Comparisons of this type with the reinforced concrete arch, show the latter to cost but little, if any, more.

Up to the present time the scope of concrete, as applied to bridges, embraces flat slab bridges (with or without girders) and arched bridges. It is entirely within reason to assert, however, that this material will be used more freely in the future. The writer has in mind movable bridges of the lift type of short span. The possibility of deep concrete girders on the sides supporting a concrete floor is apparent. Such a design would doubtless involve difficult problems, perhaps insurmountable, but the idea is at least within the realm of possibility.

The town of Ross, in Marin county, State of California, recently had erected five small bridges, three of which are represented in figures 4, 5 and 6. With the exception of the arch, all were designed as continuous girders with a central span and overhanging counterweights. This method produced comparatively light structures. The writer knows of no other instance wherein this method of design has been applied in bridges of reinforced concrete. These structures have carried heavy road rollers without visible effect.

The most ornamental of the Ross bridges is shown in figure 4. It is about 80 feet long, with a clear roadway of 20 feet, and a 5-foot overhanging sidewalk. The central span is 47 feet, carried by deep girders having

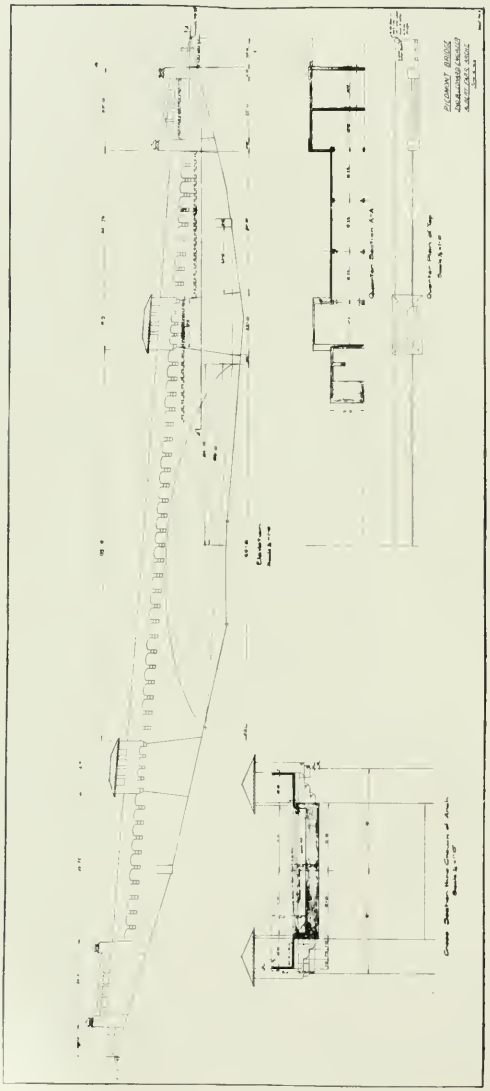


Fig. 1—General Elevation and Sections, Reinforced Concrete Bridge, Piedmont, Cal.
Albert Farr, Architect
W. P. Day, Engineer in Charge of Construction
John B. Leonard, Engineer.

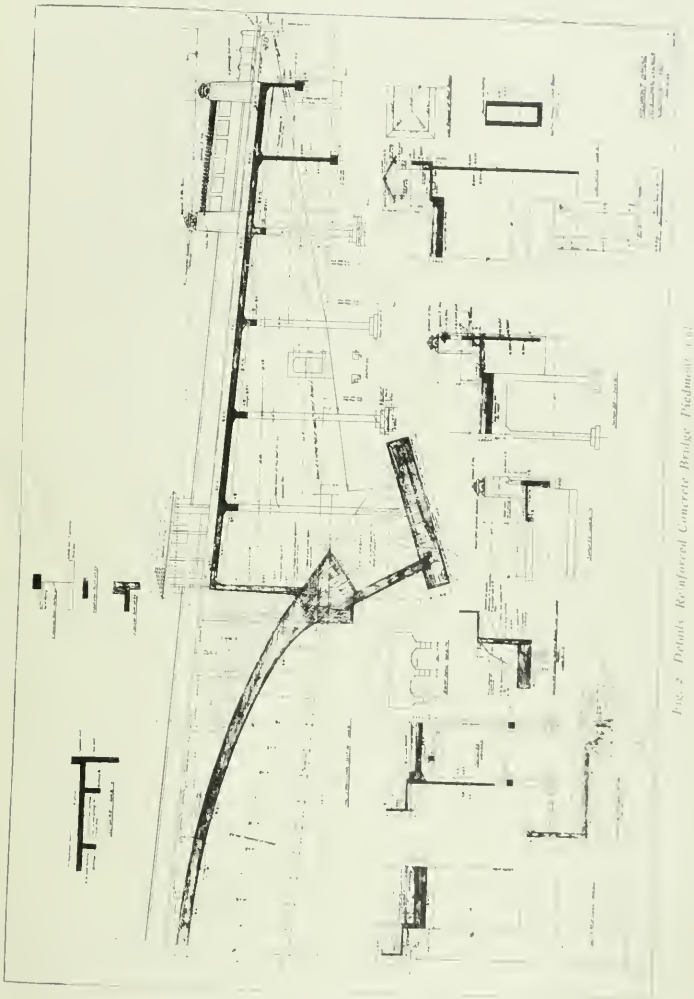


Fig. 2 Details Reinforced Concrete Bridge Piedmont, Cal.

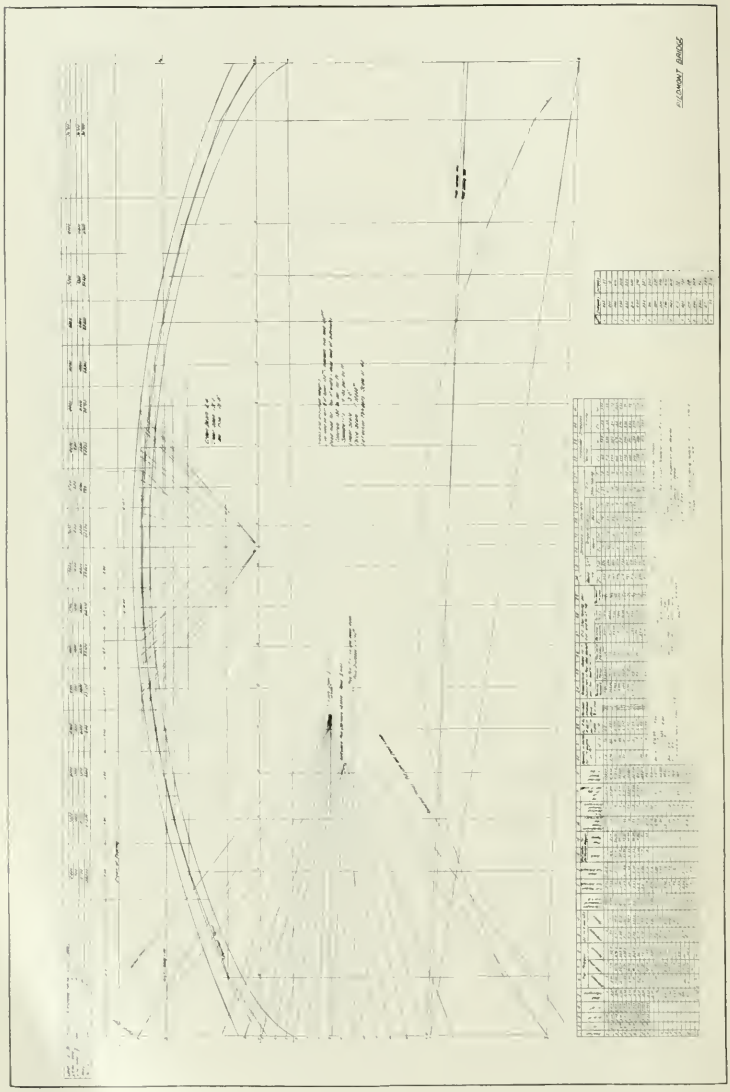


Fig. 3. Stress Sheet, Reinforced Concrete Bridge, Piedmont, Cal.

anchor arms at either end, and supported by solid concrete walls resting on firm soil several feet below the bed of the creek. The counterweights are obtained by utilizing the end retaining walls through anchors from each girder into the wall. The railing is of concrete cast in place and tied to the parapet with short anchor rods. The roadway is of asphalt, three inches thick.

The bridge shown in figure 5 is of the same general type structurally as the one just described. It is considerably smaller, however, and it was found possible to economically use a slab without girders. The central span is 24 feet in the clear, the anchor arms 10 feet 6 inches in the clear. The slab is 14 inches thick, reinforced top and bottom. The floor is carried by solid concrete walls which are 1½ feet thick at the top and taper to 2 feet at the bottom, with a footing of 2½ feet. This is the fundamental type of the anchor arm bridge. It will be noted that this type permits of very simple foundation work, and requires nothing but simple and uniform forms. The view shown is unfortunate in that it shows in detail the lack of fill and road work, conditions which are being taken up at the present time, this work not being in the province of the contractor.

The arch shown in figure 6 has a clear span of 48 feet, a clear roadway of 20 feet, is 12 inches thick at the crown and about 2½ feet thick at the haunches. Its design offered no problems out of the ordinary. The arch itself was analyzed graphically by the elastic theory and sized accordingly.

The Marsh street bridge, San Luis Obispo, shown in figure 7, is simple in appearance, but a little more difficult in design. It is a skew bridge of the ordinary girder type without the anchor arms described in connection with the Ross bridges. The span is about 43 feet in the clear, the roadway 50 feet, with two additional 10-foot sidewalks. The observed distance between the crown of the road and the high-water mark is very small at this point, and it became necessary to make the depth of the girders a minimum. The roadway is of asphalt, 3 inches thick, and is crowned 10 inches. The bottoms of the girders are in a horizontal plane, the decreased depth of the girders near the gutters being taken care of by decreasing proportionately the distance between them. The result was lack of uniformity in the form work, but practical considerations made this procedure necessary. Another feature of this structure is the use of a heavy steel bracket to support the outside girder shown in the cut. This girder, owing to the flare in the end wall, became of such length that its depth could not be kept within the desired limits. The steel bracket, encased in concrete and firmly anchored into the transverse end wall of the bridge, is faintly shown in the picture. The city engineer of San Luis Obispo is Mr. George Story.

The high-water mark at a projected bridge crossing is often such that the distance from the finished roadway to the bottom line of the floor of the bridge is limited, as was the condition on the San Luis Obispo bridge. The arch type becomes undesirable owing to the great reduction of waterway. With this limitation, the flat slab type, such as was used in the town of Ross, becomes an ideal structure, both structurally and economically. The average cost of the Ross bridges, including the ornamental structure with bracketed sidewalks shown in figure 4, was less than $2.50 per square foot of roadway.

Within the past month excavations have begun on Oakland avenue, at Linda avenue, Piedmont, Cal., for the piers of a large reinforced concrete bridge to be erected by the city of Piedmont. The contractors for the work are the Rickon, Ehrhart Company of San Francisco. The engineer is John

Fig. 4—Reinforced Concrete Girder Bridge, City of Ross, Marin County, California
John B. Leonard, Engineer

Fig. 5—Reinforced Concrete Flat Slab Bridge, City of Ross, Marin County, California
John B. Leonard, Engineer

Fig. 6—Reinforced Concrete Arch Bridge, City of Ross, Marin County, California
John B. Leonard, Engineer

Fig. 7—Marsh Street Bridge, San Luis Obispo, Cal.
George Story, City Engineer *John B. Leonard, Consulting Engineer*

B. Leonard, and the architect, Albert A. Farr, both of San Francisco. The contractor's superintendent is W. A. Mann. The city of Piedmont invited four engineers to submit plans, in competition, for the above crossing, in accordance with profile sheets prepared by the county engineer. The structure described below was chosen by the board of trustees of the city of Piedmont for its artistic features, and by the board's engineers for structural stability.

When completed, this bridge will have one of the longest reinforced concrete arch spans on the Pacific Coast, the plans calling for a span of 130 feet in the clear. The total length of the bridge is 362 feet 10 inches, being composed of the arch above mentioned and an approach at either end. The roadway is 22 feet wide, with an additional 6-foot sidewalk on either side. The arch is 2 feet 4 inches thick at the crown, and tapers to about 4 feet 6 inches at the haunches. It carries an earth fill held laterally by thin spandrel walls designed as horizontal beams, and carries, also, a 6-foot sidewalk on each side, bracketed from the spandrels and tied to the rib by reinforced buttresses. The arch is reinforced both longitudinally and transversely by billet stock steel rods with mechanical bond. The stress sheet for the arch, made graphically by the elastic theory, combines the effects of vertical loads, temperature, and rib-shortening. Reference to figure 3 shows that the thrust line for the vertical loading alone is within the middle third of the arch throughout and, theoretically, no steel is required for reinforcement. Slight tension may occur for a limited length under the combination of loading, rib-shortening, and a range of temperature of 40 degrees Fahrenheit. The maximum compression at any point for all conditions is 636 pounds per square inch. The writer does not believe, however, that this stress will ever occur, since the concrete will never attain the variation in temperature assumed above. In the choice of the curve of the rib, an attempt has been made to combine both beauty and maximum strength with minimum material, and it is believed that this result has been accomplished.

The abutments carrying the arch are hollow, with a solid base penetrating the adobe soil and reaching to the clay and gravel. The base measures 39 feet transversely and 30 feet longitudinally, and is tilted as shown in the details (figure 2) for maximum efficiency in resisting the thrust.

The floor of the approaches is a 15-inch reinforced concrete slab, carried by girders and columns, all inclosed by 6-inch curtain walls. The approaches, as well as the rib, are designed to carry a street car, in case the city of Piedmont see fit, at some future time, to extend tracks over the bridge.

Architecturally, the structure is to be of the Spanish Mission type, so well exemplified in some of our old California buildings. The span has two resting places at either end, and four intermediate kiosks supported by light concrete columns and roofed with Spanish S tile.

* * *

Ten Tons of Seed for Restocking National Forests

THE United States Department of Agriculture is using this year on the national forests over ten tons of tree seed. Most of this seed has already been planted or sown. The rest will be utilized later in the season, as favorable conditions are presented.

It takes a great many tree seeds to make ten tons. Jack pine, the most important tree for planting in the Nebraska sand hills by the forest service, will average something like 125,000 to the pound. Of western yellow pine, the tree most extensively planted throughout the national

forests as a whole, 10,000 seed will make a pound. Altogether, the ten tons of seed to be used this year represent perhaps 300,000,000 single seeds.

If every seed could be depended on to produce a young tree suitable for planting, the result would be a supply of nursery stock sufficient to plant 300,000 acres of land, but no such result can be looked for because many seeds do not germinate. Most of the seed will be sown, either broadcast or in seed spots, or planted with a corn-planter, directly in the place where the trees are to stand.

Even when nursery stock is raised a liberal allowance must be made for loss. In the first place, a considerable percentage of the seeds will be found to be unfertile. Of those which germinate, many will die before they leave the nursery beds, and many more will be lost in transplanting. If from a pound of western yellow pine seed that contains 10,000 individual seeds, 4,000 three-year-old transplants are available for field planting, the Department of Agriculture has obtained satisfactory results.

There are now twenty-four national forest nurseries with an annual productive capacity of over 8,000,000 seedlings. But there are many millions of old burns on the national forests which are waiting to be restocked, and some quicker and cheaper method than the actual planting of nursery-grown trees is urgently needed. Therefore the foresters are making experiments on a large scale with different methods of direct sowing and planting, and most of the seed gathered last year was obtained for this use.

Broadcasting has already been found to give good results in some regions. It was first tried in the Black Hills of South Dakota, with an encouraging outcome. To broadcast an acre of land with yellow pine seed about eight pounds of seed is used. One of the most formidable drawbacks to this method is the extent to which the seed may be consumed by birds and rodents. If the season happens to be one in which food for these animals is scarce, the loss is very heavy. The problem of control of animal pests, such as field mice, ground squirrels, and gophers, which eat the tree seeds, and also the further problem of preventing the depredations of rabbits, which are altogether too fond of the little trees themselves, whether nursery transplants or field-grown seedlings, is receiving the attention of the Biological Survey experts of the Department of Agriculture.

In some localities the department has had to purchase seed, but most of that used is gathered by forest service men themselves. The cost of gathering has varied for the different regions from 35 cents to $1 a pound. As a rule the seed is collected in the fall months, when most conifers ripen their seed. Parties of three or four men ordinarily work together. Where lumbering is in progress the collectors follow the sawyers and take the cones directly from the felled trees. In standing timber, the task is much more arduous. The men must often climb tall pines and pull the cones from the branches as best they can. Where these are on the extremities and beyond the reach of the hand, pruning shears are used. The cones are dropped to the ground and then gathered into buckets and transferred to sacks, in which they are carried to a central point for further treatment.

The extraction of the seeds is tedious rather than difficult. In some cases the cones are spread out upon sheets in the sun, when, after a time, they open and the seed drop out; in other cases it is necessary to resort to artificial heat. This is applied by placing the cones upon trays with screen bottoms and raising the temperature of the room to the proper degree. The cones open, the winged seeds fall out, and the seed is separated finally from the wings and dirt by a fanning mill. A good many seeds have been removed from the cone by hand, but this is a sore trial to the fingers of the pickers, and an exceedingly slow process.

Washington Street Elevation, Oakland City Hall
Palmer & Hornbostel, Architects

Oakland's New Municipal Building Marks a Step Forward in American Architecture

By HENRY HORNBOSTEL.*

The complete renderings of the Oakland city hall that won the recent competition, held under the auspices of the A. I. A., are shown for the first time in this issue of the Architect and Engineer. The junior member of the successful firm of competing architects, Henry Hornbostel, of Palmer & Hornbostel, was invited to give the readers of this magazine a description of the building, the problems that had to be worked out, and the inspiration that brought about their development. What Mr. Hornbostel says is, indeed, interesting, and his declaration that the plan represents a step forward in steel architecture, which latter style is pre-eminently American, should prove an incentive to fellow-members of the profession to make the building a prototype of city halls in the future.—Editor.

THE drawing of Oakland's new municipal building was not the outcome of conditions, economic and artistic, notwithstanding the fact that the architect in these days is invariably called upon to find artistic solutions of the most complex problems in architecture. A big city administration in this country was at one time comparatively simple, and most likely inefficient. But with the advance of the country, and especially with the growth of its important cities, and the introduction of all the modern contrivances which add to the complexity of our lives, the government of a city became a sort of business corporation, which would have to naturally exist in sympathy with the commercial, thrifty and progressive spirit of its citizens. Therefore, when a municipality like Oakland wanted to build its city hall it sought to run its entire municipal business in one large and practical headquarters, just as a big commercial house would do.

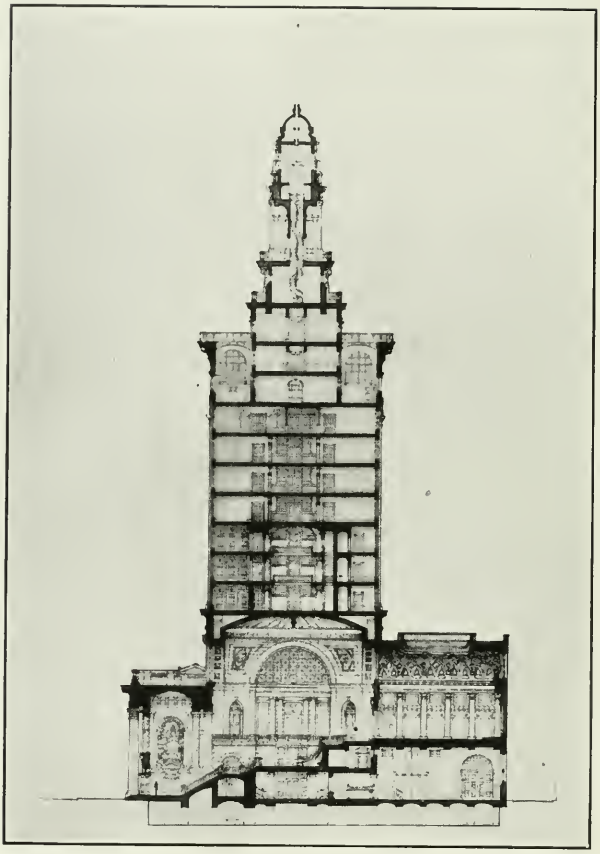
The problem presented to the architect in this case was to create a building that was (1) pre-eminently practical; (2) one that retained a certain sentiment of the dignity and the luxury of the early city halls of this country, and (3) to follow the precepts set down by an architecture of this country created through its commercial needs; that is to say, the office building, which in itself was an architecture created by the use of steel construction.

These points well defined, the solution of the problem as at first presented was perfectly logical, and could not have been any other kind of a solution. Naturally, the knowledge of the architect was used to make this combination a happy and a graceful one. And as to its appearance and execution one will have to reserve one's opinion until the proper time comes.

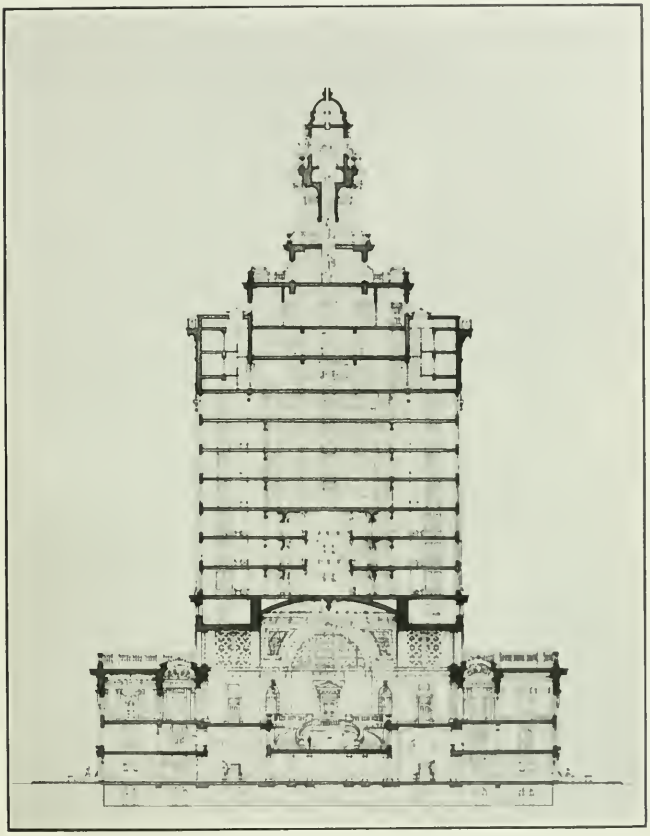
The solution, curiously enough, is just one step in the gradual evolution of the steel constructive architecture of this country, which is pre-eminently American, and in which America has set the pace and given the models to the world.

This city hall being the first step of combining steel architecture, the commercial spirit of concentration, and the sentiment of charm which means sacrifice and luxury, is unique, and will probably be the prototype of many more city halls to come. It ought to be the architect's ambition to make the prototype as beautiful as possible, so that the next

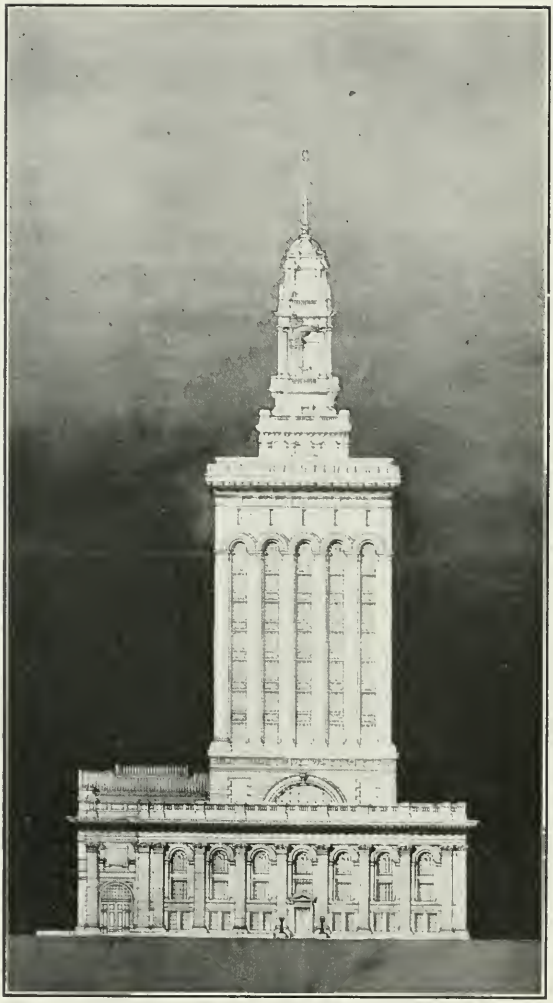
*Member of the firm of Palmer & Hornbostel, architects, New York City



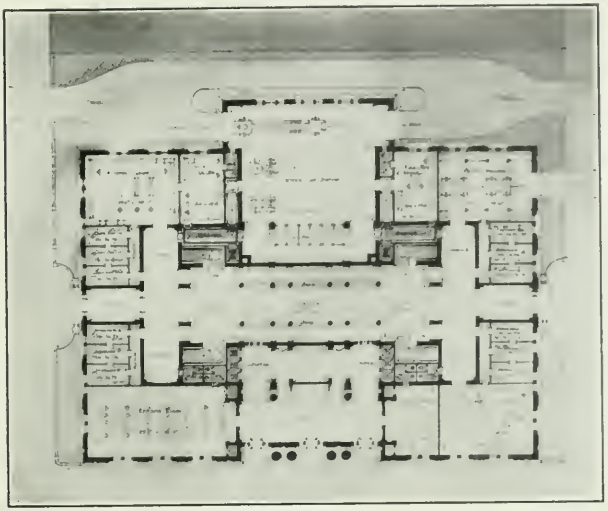
Transverse Section, Oakland City Hall
Palmer & Hornbostel, Architects



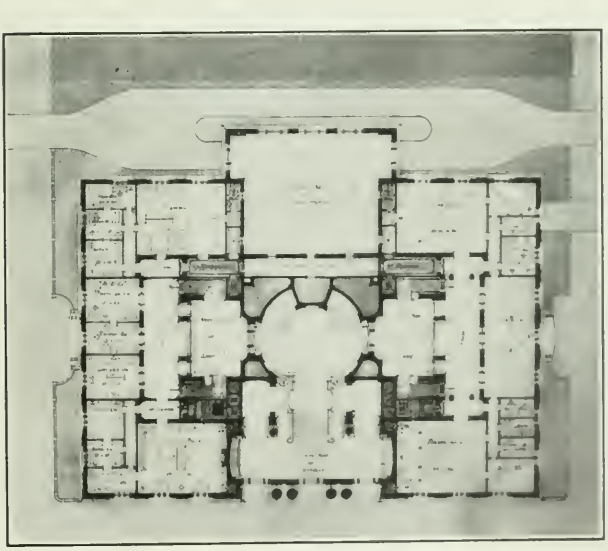
Longitudinal Section, Oakland City Hall
Palmer & Hornbostel, Architects



Fourteenth Street Elevation, Oakland City Hall
Palmer & Hornbostel, Architects



Ground Floor Plan, Oakland City Hall
Palmer & Hornbostel, Architects



Second Floor Plan, Oakland City Hall
Palmer & Hornbostel, Architects

one will not outshine it. There happens to be a building material in this country of most excellent texture and color; in fact, a material the like of which does not exist in any other part of this country. The site of the building was well chosen, and it seems as if this highly modern building was entirely in harmony with the spirit of this city of Oakland.

The inspiration which caused this building to be designed is not one created offhand, but is the result of cumulative attempts to adjust difficult problems of this kind. To illustrate this, it would be interesting to relate that the first municipal office building to contain all offices was designed and suggested by an architect whose early sketch thereof, made nine years ago, is similar to the one they are building now. Later the architect suggested an 800-foot high municipal tower for New York, which was the first time a project of that kind was shown to the public. It has since been realized by the huge towers built by life insurance companies. Only three years ago, the Alleghany county courthouse, in Pittsburg, a masterpiece of architecture by H. H. Richardson, required more room for its courts. The architect suggested a huge tower rising out of the central court of the present building, and drawings of this were published and given to the architectural world at the time.

So when this problem came on it was an easy matter, after studying the conditions, to realize that a scheme of that kind was perfectly feasible, if it could be solved architecturally, economically, and artistically. There was a suggestion of a tower city hall made previous to this competition, by an architect of Oakland, a personal friend of mine, Mr. Charles W. Dickey, who was East, and with whom I talked on this very subject, telling him that the proper solution of a modern city hall in a modern city of this country, was some well-studied and interesting solution of this very scheme. The competition clearly illustrated how very novel and sudden this scheme was, because out of all the twenty-five architects who represent the modern spirit of today, there were only two that tried to give a solution of this kind, and the one which was mine happened to be more thoroughly studied than the other.

The others had tried in a masterly way to adjust all the varied and complicated requirements in a building following the early traditions of a city hall, and in a building which could be built on the old lines of masonry construction, and they encountered all the difficulties which a procedure of that kind generally leads up to. In the building which was chosen the requirements of the old city hall were placed in a building which had the appearance of the early city hall, and the requirements of all the departments were placed in a tower or office building which allowed the greatest amount of light, and in their internal arrangement afford the greatest flexibility. The prison, placed on top, was a happy thought, and gave the building a crown; a crown that was made attractive and hid the more sinister use of this space.

If one wishes to analyze this building and standardize it with traditions of the architects of Europe, it could be torn to pieces, because it practically scandalizes all rules and regulations of the past. But if one considers the development of the steel architecture of this country, which is our own, then we realize that it is a decided step in advance. The architect's greatest ambition is that it will be a prototype of city halls in the future, and the architect furthermore congratulates with no sense of conceit, the city of Oakland for its courage and appreciation in setting the pace. In fact, the way the competition was conducted does enormous credit to the community and its mayor, and will do much to set an example as to how to proceed in future similar undertakings.

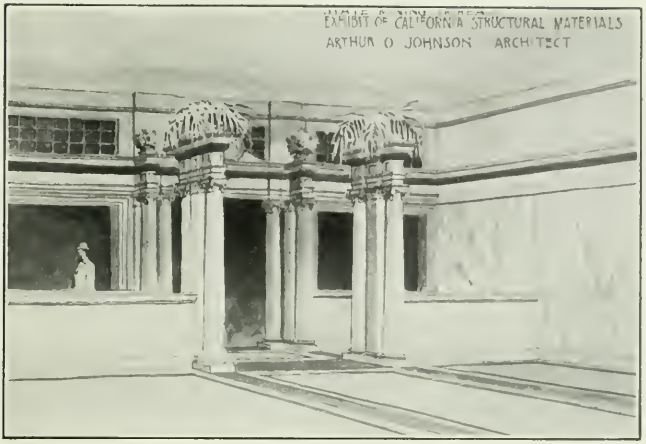


Exhibit California Structural Materials, San Francisco, Cal.

California Products are Good Enough for Our Federal Buildings

By LEWIS E. AUBURY, State Mineralogist of California.

THE fight is on to induce the supervising architect of the Treasury Department of the United States, Mr. John Knox Taylor, to give preference to structural and industrial materials produced in California in the construction of its Federal buildings.

An effort is in progress to inform all public officers of the State, of the counties, and the cities and the towns, all supervisors and all others in authority, that Section 3247 of the Political Code makes it obligatory that they shall favor the products of this State in preference to products of any other part of the world, in buildings and for all other uses.

A movement wider than this, in the same direction, has been initiated to induce all private property owners to follow out the same line of procedure when they have buildings to be erected, and influence will be brought to bear on architects, by showing them, through the agency of a permanently maintained and comprehensive exhibit, of the quality, variety and available quantities of all structural and industrial materials in the State for use.

These three lines of endeavor have originated in the California State Mining Bureau. The trustees of this institution and the State Mineralogist are pledged to promote the interests of the State by an extensive and thorough campaign, in which every legitimate means possible will be used to increase knowledge of, and the use of State resources for the common good of all California.

There is so much work to be performed, and the details are so many, and the interest of the entire State in a successful outcome is so obvious, that this bureau expects to get help in all quarters, and expects hearty

co-operation all along the line. In this view of the case some general statement of facts may be considered timely. The publication of them by wide-awake journalists distinctively constitutes a service of the first order, which certainly will be appreciated by readers.

Referring to the first paragraph of this article, it may be said in passing, in all justice, that the supervising architect of the Treasury Department has maintained for some years an attitude of discrimination against California. This has become so marked and persistent, and accompanied by such evil results, and the offenses committed in pursuance of this policy have been so numerous and glaring, that it is necessary that the attention of all Californians should be called to the facts, and that an attempt should be made to rally all classes to the defense of home industries.

For some years this bureau has striven to get the supervising architect to give California a show. The fight for justice will not be stopped until it has been won in favor of this State. While this is in progress the State Mineralogist has caused the sending out to every State, county and municipal official in California of a communication which is, in part, as follows:

"In calling this Act to your attention, our desire is to impress upon every State, county, or city official, board of trustees, or other governing body who may be given power to purchase supplies, the intent of the people, as represented by our legislature, to patronize home industries. The State Mining Bureau is particularly interested in promoting the use of building material produced in California, such as granite, sandstone, slate, cement, marble, gypsum, brick, terra cotta, tiling and other clay products; magnesite, infusorial earth, asphaltic products, mineral paint, and in fact every other mineral product of the State which enters into construction.

"Where a public building is to be erected, we believe it to be the duty of every official to attempt to carry out the letter and the spirit of this law. The future prosperity of our State depends upon the support which is to be given to our struggling industries, and in our opinion no material advancement can be made by these industries if we send our capital to purchase foreign material when we are amply able to supply these materials ourselves.

"Should you not be informed as to where any class of structural material is to be obtained, the names and addresses of producers are on file at the State Mining Bureau, and we will be pleased to furnish them upon application. As soon as our new structural exhibit is completed, the products will be open for inspection."

In my opinion property owners will see, on reflection, whatever influences may be brought to bear to induce them to permit specifications that call for foreign products, that their interests lie in the direction of patronizing home industries.

Several years ago I first called notice to the acts of the supervising architect of the Treasury Department in relation to the framing of specifications for public buildings in this State. Since then no effort has been spared to arouse public interest in a matter of great public concern. But, in the interim, costly structures have been erected by the Government in California, wherein materials brought from abroad, to the exclusion of home products, have been employed to the detriment alike of the government and the people of this commonwealth. Costs have been unnecessarily increased by this procedure, and the construction work is less durable than it would be if the California building stones, etc., had been made integral parts of the structures in question.

That this view is not confined to the writer, but is also the opinion of intelligent on-lookers, is manifested by the following editorial matter that was published in the San Francisco Call of July 15, 1910, in which the subject of official discrimination is considered:

"The San Francisco postoffice building is perhaps the most notorious and most disgraceful example of this form of discrimination. That building cost more than $2,000,000, and its erection was characterized by scandalous waste of money. Marbles were imported from Europe and even from Africa, paying freight across two continents and an ocean, when equally good materials could have been found right here in California, where we have some of the finest marble and onyx quarries in the world.

"The Colusa sandstone is as good as any to be had elsewhere, and indeed the supply of this material is unlimited in this region, but the government bureau will not use any of it.

"The precedent set by the specifications for the San Francisco post office building has been followed in the matter of supplies for the Los Angeles and Santa Rosa public buildings, and in relation to work planned for Mare Island Navy Yard, where the local supplies of fire clay were excluded from the bidding. It will scarcely be disputed that California has fire clay in quantity and of the best quality, but the bureau will have none of it.

"Doubtless it will be necessary to go over the heads of the bureau to obtain the reform of an abuse of such long standing, buttressed as it must be by powerful interests, but the case is so strong on the side of the local manufacturers that it should only require a competent presentation of the argument to compass the change of policy."

The California State Mining Bureau is making strong efforts to have the argument made "in favor of a change of policy." More than that, it is adopting means to bring the necessary presentation of facts to the attention of those above the bureau of the supervising architect, as soon and as forcibly as possible.

It is in this connection that the present movement in behalf of California's structural and industrial materials, produced at home, becomes of great public interest. The producers have been reached by communications as far as possible. The circular letters, etc., will be followed up by personal visitations by a State Mining Bureau representative, Mr. W. W. Thayer, who is instructed to promote in all possible ways a permanent exhibition of California structural and industrial products which will be instituted by and maintained by the California State Mining Bureau in the Ferry building in San Francisco.

Meetings will be held of the different classes of mineral producers, who are the directly interested parties. The manufacturers of terra cotta have already met and have enthusiastically taken hold of their portion of the work to be performed. After a while there will be a general "get together" meeting or convention, at which all branches of the related industries will be represented.

The California Development Board, which is a combination of the California State Board of Trade, the Manufacturers' and Producers' Association and the California Promotion committee, met recently and adopted the following resolution:

"Resolved, That a campaign be inaugurated to encourage the use of all California materials in all public buildings in California; also that the campaign to this end now being advocated by State Mineralogist L. E. Aubury and the Mining Bureau of California is especially timely and should prove effective."

A resolution was also adopted by the same board providing that the resolution foregoing should be brought to the personal attention of the supervising architect of the Treasury Department.

The following communication has been received by the State Mineralogist from Mayor Frank K. Mott of Oakland, which is an excellent sign in connection with the construction by Oakland of its new city hall, and which serves well to illustrate the interest that already has been awakened:

"I am in receipt of your letter of July 8th and, in response, will state that the matter has already been discussed by the board of public works, and we will insist upon the use of California materials whenever the same can be obtained."

This may be called the first fruits of the campaign, and as such the patriotic decision of the Oakland officials cannot be other than acceptable to the people of the State.

As a part of the campaign for home products on the part of the California State Mining Bureau, plans have been adopted to have all possible information placed promptly in the possession of owners of property and of architects to be engaged, as early as a declaration of purpose to build has been made. All interested will be invited to view the permanent exhibition of structural and industrial materials to be placed in the State Mining Bureau and see for themselves what the State can produce and does produce.

What structural materials does California include in its annual output? This interesting question is best answered by extracts from the official records of this bureau, that are prepared annually, with much care, by a statistical department in close touch with every producer in the State.

The subjoined table throws a strong light on the facts. The total output for a period of twenty-three years of each of the substances named is given, and the figures and the grand total will be observed to be very large and extremely convincing:

Brick	$25,229,515
Clay	2,267,978
Granite	10,875,806
Lime and Limestone	11,552,637
Macadam	11,584,598
Marble	1,509,841
Rubble	10,441,586
Sandstone	3,757,044
Slate	653,399
Soapstone	34,299
Glass sand	129,012
Paving blocks	1,895,064
Magnesite	536,925
Gypsum	992,405
Cement	17,369,254
Bituminous rock	2,721,099
Asphalt	9,357,662
Asbestos	50,187
Onyx and travertine	91,400
Serpentine	33,259
Total	$111,082,970

Exhibit of California Structural Materials, Ferry Building, San Francisco

Probably no more illustrative evidence can be presented to show the importance of preserving an industry of such magnitude, one of the greatest in all California. That it should be made secure from attack and discrimination against it goes with the saying.

The buildings projected by the Federal government in the past few years in which the supervising architect of the Treasury Department has discriminated against California materials, include the following:

Public building in Los Angeles;
San Francisco custom house;
Santa Rosa public building;
Santa Cruz postoffice.

Also there was discrimination against California fire clay in the construction work at Mare Island, which is chargeable to governmental indifference to California's just claims in reference to the quantity and quality of its structural materials.

The foregoing table shows whether the State has the materials to deliver; and the grand total of value shows that there is a general appreciation of the materials, outside of the supervising architect of the Treasury Department. Yet there are facts enough in that one brief summary that ought to convince a supervising architect if he is fair-minded and willing to do this State justice.

The State Mining Bureau has persistently and consistently fought to prevent governmental discrimination, and will continue to do so, for the great interests of the State that are at stake preclude the possibility of any other course.

For general information the law concerning home products is presented herewith, as follows:

"Any person, committee, board, officer, or any other person charged with the purchase, or permitted or authorized to purchase supplies, goods, wares, merchandise, manufactures, or produce, for the use of the State, or

any of its institutions or offices, or for the use of any county or consolidated city and county, or city, or town; shall always, price, fitness and quality being equal, prefer such supplies, goods, wares, merchandise, manufactures, or produce as has been grown, manufactured or produced in this State, and shall next prefer such as have been partially so manufactured, grown or produced in this State. All State, county, city and county, city or town officers, all boards, commissions, or other persons charged with advertising for any such supplies, shall state in their advertisement that such preferences will be made. In any such advertisement no bid shall be asked for any article of a specific brand or mark nor any patent apparatus or appliances, when such requirement would prevent proper competition on the part of dealers in other articles of equal value, utility or merit."

* * *

Terra Cotta House with Glass Dome

ONE of the largest fireproof country homes ever built is now nearing completion at New Brunswick, N. J. The owner, Watson Whittlesey, is erecting it in the California Mission style with a center patio, or court, containing fountain and palm garden.

The house stands on a heavily wooded plot of ground overlooking the Raritan river. Walls, floors and partitions are of hollow terra cotta blocks, the exterior being finished in white stucco. All the living-rooms are on the main floor surrounding the court. On this level are eight large rooms, with two baths and a butler's pantry and kitchen.

Above the living-rooms, overlooking the palm garden and fountain, is a gallery surmounted with a glass dome thirty feet in diameter by thirty feet high. This dome is built entirely of wired glass. Around its base are fifty electric lights for illuminating the court and gallery. Just off the gallery, over the porch, is the owner's study, a room twenty-six feet long and eighteen feet wide, at one end of which is a large fire-proof storage vault of steel and hollow tile.

Under the main floor are a billiard room and a "den." Altogether, the house will contain fifteen rooms in addition to the gallery and court. None of the rooms will be papered; the hollow tile walls have a sand finish, so that they can be painted in any color.

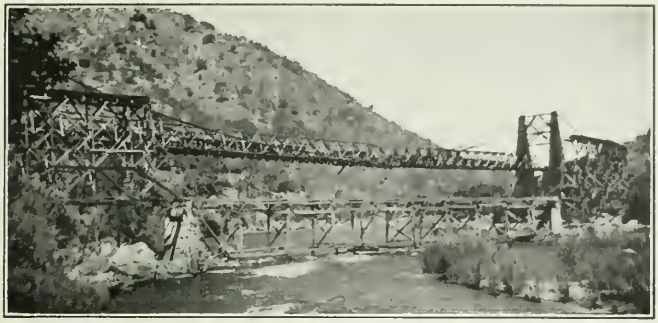
The cost of a fire-proof home is estimated as only 10 per cent greater than the cost of a frame building of the same size and style. The saving comes in the form of lower insurance rates and fewer repairs. The tile walls being non-conductors of heat, make the house warmer in winter and cooler in summer than a frame house. This is responsible for a considerable saving in fuel bills.

* * *

How We Forget

Experiments have proved that the average "forgettery" works very fast. Within twenty minutes we forget 40 per cent of our present experience; after thirty minutes, 50 per cent; after two days, 72 per cent; after thirty days, 80 per cent.

No wonder it is necessary to keep at it, and keep at it, in order to make advertising a success; that is, in order to remind the public that you want them to buy your goods.



Showing Old Suspension Bridge and False Work for New Structure Across Kings River, California

Rapid Bridge Construction Under Adverse Conditions

By O. J. CROSSFIELD.*

THE cuts shown herewith represent a 200-foot combination span, erected by the Thomson Bridge Company for the Hume-Bennett Lumber Company of Sanger, California, across the Kings river, about thirty-five miles above Sanger.

The contract for this bridge was taken on June 6, 1910, with the understanding that the structure should be finished within twenty days, or by June 26, 1910.

At the time of taking this contract the plans for the structure had not been made.

John B. Leonard, the consulting engineer, was the designer of the structure, while the Pacific Rolling Mill Company furnished all the steel, castings and bolts. The Hume-Bennett Lumber Company furnished all the material for the false work.

The lumber for the false work was brought down the broken-off flume, which is represented above the new structure, and was handled from there and put in the river. The material for the structure had to be hauled over an exceedingly rough mountain road for thirty-five miles from Sanger.

In looking at the illustrations, the first thing that impresses us is the extreme roughness of the country, being hills on both sides, rather steep, and hardly any chance for a wagon road.

It took eight horses to a two-ton load to make the round trip in three days. The river right under the bridge is nine feet deep and full of boulders and large rock.

To keep the false work in place, fifteen tons of old street car rail were shipped to the bridge site, and the false work posts weighted down with them by having two rails bolted to two sides each of the false work posts in the deepest part of the channel. The balance of the rail was piled on the girts in midstream to keep the bents from washing away.

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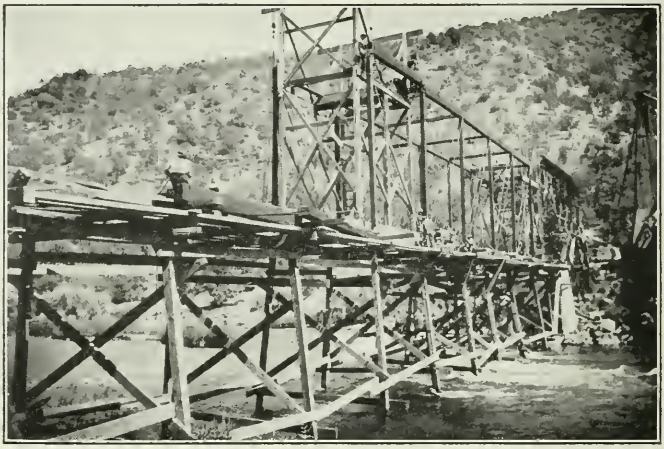
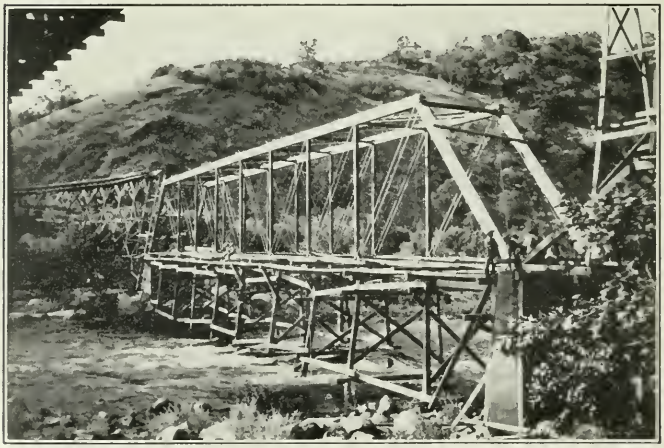
*Mr. Crossfield is general manager of the Thomson Bridge Company, San Francisco, builders of steel and concrete bridges. This is the first of a series of bridge articles by Mr. Crossfield.



Showing Supporting False Work and Traveler for Erecting Trusses, New Steel Bridge Across Kings River



Steel Bridge Across Kings River, Showing Structure Assembled; False Work Still in Place

John B. Leonard, Engineer *Thomson Bridge Company, Builders*

Old Suspension Bridge Across Kings River, California, on the Right; New Steel Bridge Under Construction, on the Left

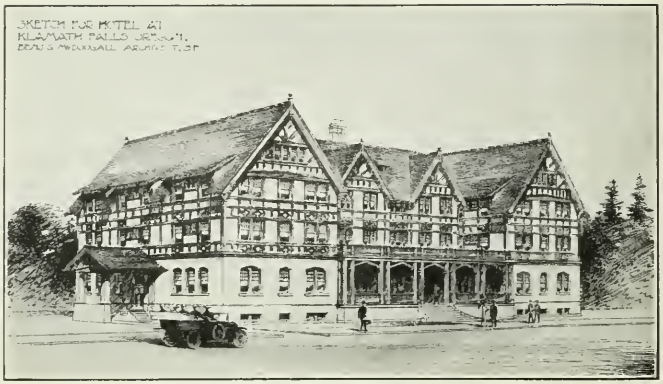
It took just one week to put the false work in place, and after that the hardest work was to get the material on the ground and in position to erect.

The erecting of the spans was done with two traveling derricks, working from the center of the bridge each way. You will notice in one of the pictures the top cord being put in position with the use of the traveler.

After the span was swung, the cords and end posts were covered with No. 24 galvanized iron, leaving a 2-inch air space all around the timber to prevent any moisture gathering in the joints.

Both the wood and the iron received two coats of Blac Lac damp-proof paint.

The structure was delivered by the Thomson Bridge Company to the Hume-Bennett Lumber Company at 9.30 a. m. on June 20, 1910, two and a half hours ahead of the agreed time.



Hotel for Klamath Falls, Oregon
Benj. G. McDougall, Architect

Improvements of Clay Products

By ANTON BERG, Toronto.

EVERY low-grade brick, poorly made and poorly burnt, is hurting the clay interests. The plea that at the prevailing low price it is impossible to manufacture good brick, will not hold, and it is simply the old case of the "survival of the fittest." This will mean either the improvement and better operation of the clamp kiln, or its replacement by better types. If the undisputed excellence of brick as a building material is to be used as the principal argument for its advancement, we must not vitiate it by offering inferior products when better grades can be made at the same cost. Here again the question of educating the public comes into prominence, for if we show what good brick really mean, they are bound to find appreciation. If the manufacturer aims, for instance, to sell no brick which show a water absorption of more than 15 per cent by weight, and let people know about it, a standard of strength would be set with which concrete would find it difficult to compete.

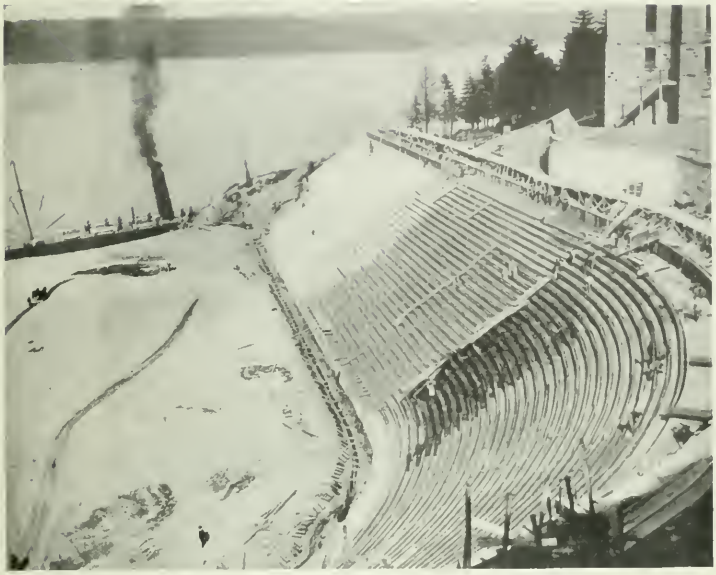
I do not raise any argument or discussion against the statement that brick and steel construction is the best for some purposes. It certainly is convenient and profitable, not only to the owner, but to the insurance underwriters. Is this the important point? I hope not. The twentieth century, conscientious man must strive for righteousness for fellow men in future generations. I have repeatedly asked: Who is responsible? Who will be responsible for the collapse when it comes? I believe the fire underwriters will not be responsible for the catastrophe to thousands and thousands. The narrow base, the unreasonable height, the vibration from storms through the years, the salt water atmosphere! This problem continually standing before us is a serious one, needing our honest and incessant study. We must co-operate in the right direction for the clay interests, that we may erect structures for all generations to dwell in without fear of collapse.

Riverside County Court House, Riverside, Cal.
Franklin P. Burnham, Architect

Polytechnic High School, Los Angeles, Cal
Franklin P. Burnham, Architect

Moore Theater, Seattle, Wash.
Houghton & Millner, Architects

Central Building, Seattle, Wash.
C. R. Aldrich, Architect



Reinforced Concrete Stadium Tacoma, Wash.

Great Concrete Stadium at Tacoma, Wash.

ARCHITECTS and engineers are showing considerable interest in the reinforced concrete stadium just completed at Tacoma, Wash., for the High School of that city. The stadium has a seating capacity equal to any similar structure in the country. At the dedication a few weeks ago, more than 10,000 persons were present. Many more could have been accommodated.

A writer in Cement Era describes the stadium at some length and the following data is taken from this article:

The high school building is a very large, fully equipped structure, probably one of the finest buildings of its kind in the county. It is located on top of the bluffs overlooking Puget Sound, and immediately beside it, in a depressed natural amphitheatre, is the stadium and playground, also looking out over the Sound.

The construction of the amphitheatre puts to practical use a natural ravine existing in the side of the bluff immediately beside the high school, and one which otherwise would have had to be filled in the course of street and property improvement. The street which passes in front of the school also crosses the head of this ravine, leaving on the downhill side a wide hollow leading out to the Sound. To fill this land near enough to street grade to make it valuable for building purposes would have cost a large sum of money, so the idea of converting it into a stadium was conceived, thus improving the site and at the same time furnishing a great benefit to the high school. It was found that the equivalent of the cost of grading

Detail Showing Main Beams and Riser Trusses

Hopper and Chute for Placing Concrete from Cars

would cover a large part of the cost of building the stadium, so the people of the city loaned direct assistance to the project, and by combination with the regular board of education funds, means were provided to erect the $150,000 structure. A playground of ample area for the needs of a large school is thus provided, with a horseshoe tier of seats around it accommodating 30,000 spectators.

The flat, graded floor of the playground is made by a fill in the lower end of the ravine, up to an elevation of 107 feet below street grade. Surrounding it are the tiers of seats, rising 50 feet from the field, or within 57 feet of street grade. Above the horseshoe are the natural slopes, sustained in some places by heavy retaining walls, and in other places supporting the stairways leading to the street and schoolyard.

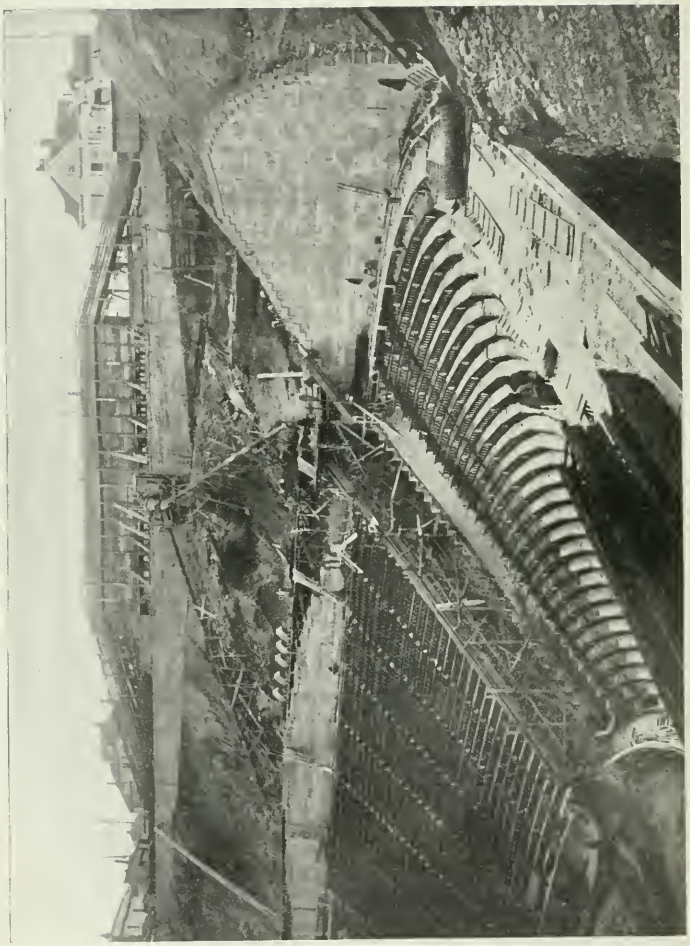
The playground enclosed by the horseshoe is about 400 feet wide and 400 feet long on the central axis. At the upper end, in the curved section of the stands, it is circumscribed by a 128-foot radius through an arc of 153 degrees, the radius gradually lengthening outside of this arc to join the straight sides. Running tracks, baseball and football fields, basket ball courts and grounds for other sports for both boys and girls will be laid out in this area.

Thirty tiers of seats make up the stands, with promenades at the top and bottom, and aisles at intervals of 39 feet. Each seat or tier has a rise of 1 foot 6 inches, and a tread of 2 feet 3 inches. The aisles passing down the tiers are 2 feet wide and are provided with step blocks on each tier, making intermediate steps with a rise of 9 inches. The lower promenade is 5 feet wide and is 5 feet above the grade of the field. The top promenade is 10 feet wide. It connects with the stairways to the street. Parapet walls 4½ feet and 3½ feet high, respectively, follow its outer and inner edges, openings being provided in the inner wall only at the aisles.

In the two ends of the horseshoe, beneath the tiers of seats, the dressing-rooms are located, with floors at playground grade. The boys' dressing-room is 50 by 60 feet, and the girls' 40 by 50. Lockers, hot and cold water showers, heaters, lavatories, toilets, and all conveniences are provided.

From the point of view of structural design the stadium is of considerable interest. The loads on each seat are taken up first by the riser beneath it, which is designed with a steel truss reinforcement to make it a thin beam. End support is given to the riser beams by continuous radial beams extending from beneath the top promenade down to that at the bottom, over the tops of a series of columns. The ends of these beams are spaced 20 feet apart along the back line or top of the stadium, and in the straight wings the beams are, of course, parallel, but in the curved section they converge radially toward the center of the curve. Including the cantilever ends beneath the upper promenade, these continuous beams are about 104 feet long. Their inclination is about two in three, determined by the rise and tread of the seats resting on them. The columns beneath the beams are in the most cases short, since the slope of the ravine beneath the tiers of seats has been cut down to agree closely with the slope of the seats. Toward the ends of the wings, where the natural ground slope flattens and falls away from the seats, the columns become longer, and in the dressing-rooms are the full height of the stands from playground grade to the bottoms of the inclined beams.

Looking at the details of the design, the seats are simple 4-inch concrete slabs reinforced with 10-gauge Clinton wire cloth, the sheets of which are laid continuously down the tier of seats, running down the riser rein-



General View of the Tacoma Stadium Looking Toward the Curve of the Horseshoe and Mixing Plant

forcement from one seat slab to the next. The risers are 3½ inches thick, forming beams 3½ inches by 18 inches, with spans of 20 feet and less, depending on location. Their reinforcement is in the form of latticed frames of small angles. The upper and lower longitudinal angles are 2½ inches by 2½ inches by 5-16 inch spaced 14 inches apart and laced together with triangular lacing of 1¼-inch by 1¼-inch by 3-16-inch angles, forming virtually small Warren trusses. Over the principal supporting beams, the adjoining frames or trusses are fastened together with small fish plates and bolts, so as to make the reinforcement of each riser continuous over the beams and around the entire stadium.

The principal beams are 10 inches wide and 34 inches deep. Along the top they have a stepped face to accommodate the seats. Each beam is reinforced in the spans between columns with five ¾-inch round rods, three of which are continuous in the bottom of the beam throughout the span, and the other two bent upward near the column supports to truss the beam. These truss bars are looped around a horizontal, transverse bolt over the column which forms a connecting pin between the bars of one span and those of the next. Thus continuity of steel is obtained in the top of the beam over the column. In addition to this, however, two other short bars are run continuously over the top of this pin and one-third of the way into the span on each side beyond, bending down in line with the truss bars. These additional bars remove sole dependence from the pin connection. Stirrups ⅝-inch in diameter are placed at intervals of 8 to 12 inches.

Support is given to the upper promenade on cantilever ends of the principal beams. The anchorage of these cantilevers past the point of support is provided with connecting bars placed similarly to those over the supports of the continuous beam, as described above, and also through additional ¾-inch bars in the top of the beam and in the floor of the promenade, which are tied back to the main beam. The floor of the promenade is reinforced with 4-gauge Clinton wire mesh.

All of the columns or footings beneath the principal beams are similar in design and the greater part of them are in heights not exceeding 3½ feet. In the dressing-rooms, however, there are columns the full height of the stand. They are octagonal, 18 inches in diameter, reinforced with four 1-inch corrugated steel bars tied together in a square with two strands of No. 6 wire at every 8-inch interval. Column footings are on stepped slabs 2 feet thick, 3½ feet square for a height of one foot and 2½ feet square above.

Thin curtain walls enclose the two dressing-rooms, but carry no loads. Their thickness is uniformly 6 inches, and the height is variable up to a maximum of about 40 feet. They are reinforced with ¾-inch vertical rods at intervals of 3 feet and ½-inch horizontal rods at 4-foot intervals.

Near the curved end of the stadium there are several points where the natural slope strikes above the top of the structure, and retaining walls are necessary along the outer edge of the upper promenade. There are four of these walls, varying in height from 20 to 30 feet, and in length from 100 to 250 feet. In general they are of massive construction and heavily reinforced. They are made proof against seepage of ground water from behind by coating the backs with Toch "R. I. W." waterproofing compound.

In order to prepare the site for the stadium, about 150,000 yards of grading was necessary. About two-thirds of this was in hardpan, for beneath the surface soil the sides of the ravine consist of a cemented gravel hardpan. The grading consisted largely of moving the surplus material from the sides in the upper end of the ravine down to the lower

end to fill in the middle. The greatest height of the fill was about 100 feet. In handling the softer material, two hydraulic jets sluiced down to a steam shovel near playground grade and the shovel loaded to trains. Blasting and loading by steam shovel were necessary on the underlying material.

All concrete, a total yardage of about 10,000, was mixed at street level at the upper end of the curve of the horseshoe, from which central point it could be most economically distributed to all parts of the site. Gravel and sand were brought in dump wagons, which were driven up an incline over the bins, located at the side of the street. The gravel bins had a capacity of about 400 yards and the sand bin 200 yards. Charging cars of a mining type passed along beneath these bins and received their charge of sand and gravel, the cement being added at a cement shed beside their tracks. Golden Gate Portland cement was used. At the mid-point of the bins, the cars were transferred by a turn-table to short stub tracks leading to a ½-yard Smith mixer, which was mounted just below the street level so as to face out into the horseshoe along the central axis. A wood pipe chute led the mixed concrete down to the top of the stadium ring. From this point it was distributed directly by other chutes to the column, beam and seat forms in that vicinity. After the work had progressed in both directions from the mixer to a point where it could not be reached by direct chutes, small steel mining dump cars were installed, with tracks laid in both directions along the top promenade of the stadium. The chutes from the mixer then led the concrete to the cars, which were pushed around to the point where work was in progress and then dumped into other chutes leading down the face of the seat tiers. The distribution chute was arranged with a hopper at the top, into which the cars dumped, and three channels radiating from it to three points on the stand. By means of a gate in the hopper and a flap across the heads of the channels, the concrete could be diverted to any point desired. In this way three gangs were operated at each hopper, one being supplied, while the other was engaged in spreading, moving chutes or otherwise. Work was started at the bottom and carried upward, sections of the chute channels being removed as the work progressed. After each day's work on a section the dumping hopper and chutes were moved ahead for the adjoining section. With this arrangement, as high as 200 yards of concrete per day was placed in the mass sections, such as retaining walls, and about 120 yards placed on the thin slab work on the seats.

The intermediate steps to be placed in the aisles, to convert the seats at these points into stairways, were cast in groups near the mixer as 9-inch by 13-inch by 2-foot hollow reinforced blocks. They were afterward set in place.

The forms for the seats and risers were given support by wiring to the steel truss reinforcement used in the risers, described above. This proved to be a great economy in the erection work, and as the truss reinforcement was simple and quickly assembled the particular design used effected a large saving of time and expense. This design was submitted by the successful contractors, the Western Engineering Company, of Tacoma, Wash., the contract being let on the basis of competitive designs.

The architect for the stadium is Mr. Frederick Heath, of Tacoma, representing the school board. Mr. J. M. Hayes superintended the work for the architect, and Mr. A. P. Hueckel was in charge of construction for the contractors.

* * *

Excuses are the enemies of advancement.

Standard Specifications for Concrete Reinforcing Bars

THE following standard specifications governing the chemical and physical properties of concrete reinforcement bars have been adopted by the Association of American Steel Manufacturers for 1910. These specifications will be a matter of interest to all engineers and concrete construction companies, and they are published in full herewith:

Manufacture—1. Steel may be made either by the open-hearth or bessemer process. Bars shall be rolled from billets.

Chemical and Physical Properties—2. The chemical and physical properties shall conform to the following limits:

PROPERTIES CONSIDERED	STRUCTURAL STEEL GRADE		HARD GRADE		Cold Twisted Bars
	Plain Bars	Deformed Bars	Plain Bars	Deformed Bars	
Phosphorus, maximum.					
Bessemer	.10	.10	.10	.10	.10
Open-hearth	.06	.06	.04	.06	.06
Ultimate tensile strength.					
Pounds per sq. in.	55/70,000	55/70,000	80,000 min.	80,000 min.	Recorded only
Yield point minimum.					
Pounds per sq. in.	33,000	33,000	50,000	50,000	55,000
Elongation, per cent in 8 in., minimum	$\frac{1,400,000}{\text{T. S.}}$	$\frac{1,250,000}{\text{T. S.}}$	$\frac{1,200,000}{\text{T. S.}}$	$\frac{1,000,000}{\text{T. S.}}$	5%
Cold bend without fracture:					
Bars under $\frac{3}{4}$ in. in diameter or thickness	180°d.=1t.	180°d. =1t.	180°d.=3t.	180°d.=4t.	180°d.=2t.
Bars $\frac{3}{4}$ in. in diameter or thickness and over	180°d.=1t.	180°d.=2t.	180°d.=3t.	90°d.=4t.	180°d.=3t.

The hard grade will be used only when specified.

Chemical Determinations—3. In order to determine if the material conforms to the chemical limitations prescribed in paragraph 2 herein, analysis shall be made by the manufacturer from a test ingot taken at the time of the pouring of each melt or blow of steel, and a correct copy of such analysis shall be furnished to the engineer or his inspector.

Yield Point—4. For the purposes of these specifications, the yield point shall be determined by careful observation of the drop of the beam of the testing machine, or by other equally accurate method.

Form of Specimens—5. (a) Tensile and bending test specimens may be cut from the bars as rolled, but tensile and bending test specimens of deformed bars may be planed or turned for a length of at least 9 inches if deemed necessary by the manufacturer in order to obtain uniform cross-section.

(b) Tensile and bending test specimens of cold-twisted bars shall be cut from the bars after twisting, and shall be tested in full size without further treatment, unless otherwise specified as in (c), in which case the conditions therein stipulated shall govern.

(c) If it is desired that the testing and acceptance for cold-twisted bars be made upon the hot-rolled bars before being twisted, the hot-rolled bars shall meet the requirements of the structural steel grade for plain bars shown in this specification.

Number of Tests—6. At least one tensile and one bending test shall be made from each melt of open-hearth steel rolled, and from each blow or lot of ten tons of bessemer steel rolled. In case bars differing $\frac{3}{8}$ inch and more in diameter or thickness are rolled from one melt or blow, a test shall

be made from the thickest and thinnest material rolled. Should either of these test specimens develop flaws, or should the tensile test specimen break outside of the middle third of its gauged length, it may be discarded and another test specimen substituted therefor. In case a tensile test specimen does not meet the specification, an additional test may be made.

(d) The bending test may be made by pressure or by light blows.

Modifications in Elongation for Thin and Thick Material—7. For bars less than 7-16-inch and more than ¾-inch nominal diameter or thickness, the following modifications shall be made in the requirements for elongation:

(e) For each increase of ⅛-inch in diameter or thickness above ¾-inch, a deduction of 1 shall be made from the specified percentage of elongation.

(f) For each decrease of 1-16-inch in diameter or thickness below 7-16-inch, a deduction of 1 shall be made from the specified percentage of elongation.

(g) The above modifications in elongation shall not apply to cold-twisted bars.

Number of Twists—8. Cold-twisted bars shall be twisted cold with one complete twist in a length equal to not more than 12 times the thickness of the bar.

Finish—9. Material must be free from injurious seams, flaws or cracks and have a workmanlike finish.

Variation in Weight—10. Bars for reinforcement are subject to rejection if the actual weight of any lot varies more than 5 per cent over or under the theoretical weight of that lot.

* * *

Importance of Plastering

THAT the proper plastering of a building is given entirely too little consideration by the building public and that many people would be willing to pay more for a good job of plastering if they understood the importance of this part of construction is the belief of William Exworthy, business agent of the Plasterers' union of Minneapolis.

Mr. Exworthy has been in the plastering business in Minneapolis for the last twenty years, and gives the following as the result of his observations:

"The plastering of a building, whether a home or business block, is one of the most vital points that enter into the integral part of the construction. Although the cost is small as compared to the other materials and workmanship it should be the aim of any one who is having a job of plastering done to see that he gets results for the money expended on this part of the building.

"Many of the parts of a building are covered up and are not visible, still it is important that the workmanship and material should be just as good as the rest. On the other hand, plastering is in plain sight and a poor job is an eye-sore all the time, while a good job is a joy forever. Some may say, 'Oh, I am going to decorate anyway,' but decoration will not straighten out crookedness or baseline or make the finished woodwork fit close to the wall as it should in order to have a pleasing effect. Money that may be saved on a poor job of plastering is more than doubly lost by the appearance of the decorations.

"Plaster, properly mixed according to the directions sent with all hard wall plasters and applied to an average thickness of one-half an inch, has great fire resisting qualities and will stand an enormous amount of heat

before it will crumble. From this point of view alone it should be entitled to the most careful consideration of the home-builder.

"From a sanitary point of view, a good job of plastering has no equal in the prevention of dirt and disease. There are no joints for insects or vermin of any kind, or breeding places for diseases. This is true, no matter whether the material used is of the many hard wall plasters that are on the market or ordinary lime mortar, providing the plastering is properly done.

"The cost of plastering as it is done today, like many other works of construction, depends somewhat on the fluctuations of the market of the materials used. But it is safe to say that a good job can be done for 28 cents a square yard for ordinary flat work. If metal lath is used instead of wooden, the price increases in ratio to the quality of the lath used. It is necessary to take into consideration the conditions governing the different surfaces to which the plaster must be applied in computing the cost. Surfaces that are not of the flat kind are harder to work on and some are hard to get at. Not only the material but the time taken to apply it influences the cost."

* * *

Influence of Size of Building Upon its Cost

IN connection with an investigation of the cost of mill buildings, Charles T. Main, architect and mill engineer of Boston, has established some interesting relations between the size of a building and its cost. He shows that there is an immediate decrease in cost as the width is increased, due to the fact that the cost of the walls and outside foundation, which is an important item of cost, relative to the total cost, is decreased as the width increases.

For example, supposing a three-story building is desired, with 30,000 square feet on each floor.

If the building were 600 x 50 feet, its cost would be about 99 cents a square foot.

If the building were 400 x 75 feet, its cost would be about 87 cents a square foot.

If the building were 300 x 100 feet, its cost would be about 83 cents a square foot.

If the building were 240 x 125 feet, its cost would be about 80 cents a square foot.

Of course the exact figures as to cost will vary year by year and with the locality, but the relative values will remain practically constant.

The minimum cost per square foot is reached with a four-story building. A three-story building costs a trifle more than a four-story. A one-story building is the most expensive. This is due to a combination of several features:

(a) The cost of ordinary foundations does not increase in proportion to the number of stories, and therefore their cost is less per square foot as the number of stories is increased.

(b) The roof is the same for a one-story building as for one of any other number of stories, and therefore its cost relative to the total cost grows less as the number of stories increases.

(c) The cost of columns, including the supporting piers and castings, does not vary much per story as the stories are added.

(d) As the number of stories increases, the cost of the walls, owing to increased thickness, increases in a greater ratio than the number of stories, and this item is the one which in the four-story building offsets the saving in foundations and roof.

Color in Relation to Walls

By JOSEPHINE WELLS RICHARDSON

FEW persons have an adequate appreciation of the effect upon their daily lives of the wall decorations in their homes. It is not only their effect from an artistic standpoint, but also the psychologic atmosphere which they create that makes them of so much importance.

The average individual will spend much time in choosing his architect, months in building his house, and he may quibble for weeks over a single antique chair; but when it comes to decorating the walls, he says: "I will have the drawing-room green; the library brown; the dining-room and my own den, red," and so on. Then, he will walk away satisfied that he has chosen the proper colors.

If the paper-hanger happens to be an artistic genius, the house-owner will be satisfied, but even then he will be living in a paper-hanger's house, not his own.

A wall should always be a background for personality; first your own personality; then the personality of your room. In other words, the rooms themselves should express different phases of your character. In the bedroom, or the den, where there is personal privacy, and freedom, you can give rein to the emotions and reveal yourself as you choose, but in the drawing-room, and other public parts of the house, you cannot be too intimate, yet you must be personal, for it is your house, not a hotel in which you are to live. Therefore the attempt should be made to translate into color the atmosphere of the life you live, in your relations with your friends and acquaintances.

It is easy to appreciate what enormous possibilities this suggests. In order to have a conclusion from which to speculate regarding the psychology of colors, it is necessary to consider them in their relation to the spectrum.

All things have color, and it is not by accident that their colors exist. Like sound, color is caused by the velocity of vibration of the colors in the spectrum. Red vibrates at the lowest rate of speed and violet at the highest. But both above and below the spectrum colors are vibrating, which cannot be seen by the human eye. This fact may be demonstrated by the photographic plate which can be exposed safely to a red light, while any other light destroys it. This shows that the rate of vibrations is so similar that there is no difference in effect between red and darkness, yet to the human eye the red vibrations are visible. Thus, it is easy to understand that there are colors which we cannot see.

Next in the scale above red comes orange; then yellow, green, blue and violet. Using these facts as a basis of speculation, we are able to form our theories regarding the effects of colors according to their rate of vibrations.

Naturally our first thought is, if red is so near to darkness, it is scarcely a color at all and should be avoided. But that idea is erroneous. There are many things which develop better in the lower lights, and not the least of these is the human mind. In the twilight our thoughts are always free and touch with tenderness our past emotions; and the coming of night is often a source of inspiration. This being the effect of semi-darkness, it must also, to a certain extent, be the effect of red. At the same time, red as a light, and red as a background, exert a very different effect. Dark red and crimson are most depressing, though people of very great vitality are often soothed by its low vibrations, but it is only when the quality of light is in red that it becomes generally desirable. Another supposed effect of

red is that of inspiring anger. By the same method of reasoning, blue, being at the other end of the spectrum, and of a very high rate of vibration, has the effect of drawing the mind out of the body to a contemplation of higher things. It is supposed to be the color of freedom, of soaring genius, and of worship.

But these are only the primary colors, and, between them, are innumerable combinations of shades and tones with which to express the subtleties of thought, and there is no reason why we should not use them as intelligently as possible for our own pleasure and benefit.

We are never really happy unless expressing our individuality. Therefore, the observations of our own particular tastes is, to us, of the utmost importance.

The first thing to consider in decorating a room is the wall. That is, of course, after the character and furnishings of a room have been definitely determined. The wall is the background, therefore it would better be neutral. For that reason, pronounced colors and patterns should be avoided, as they obtrude themselves to the exclusion of everything else. We have all seen rooms whose walls seemed about to close in upon us and crush us, and it is always because of some nightmare pattern in the paper, or a gloomy color. In such rooms we never remember what the furniture is like, or who its occupants are. The one lasting impression received is that we never wish to enter it again.

Nature, being the source of so many things, can also be depended upon as an inspiration for your color schemes. Your walls should take the place of distant trees, the sky, rolling meadows, and stretches of sandy beach, or what the painter calls the background to a picture. The color should be subdued, for to the furnishings and people belong the interest, just as in nature the flowers and near-by trees are the furniture of a landscape. And in that thought is another suggestion. The distant trees are just as green as those that are near you, yet they appear grayer, and grayer, and finally purple, as the atmosphere intervenes. Take, for example, a room with dark oak or mahogany furniture upholstered in leaf-green. The walls could be made the color of the distant trees, a grayish-green, and such a room would give the impression of size and freedom. Or take another room, where there is a rug, perhaps, and tapestries of gobelin blue. Blue is one of the colors of the sea, and what could be more perfect than a background of sand-color? You have all the shades from golden sands to silver to choose from, according to the brightness or dullness of the blue.

This might be called an impressionist method of decorating, and in it, of all people, the Japanese excel. The papers and fabrics which they produce have always the tints of nature, and their effects are invariably simple and exquisite. It is not well to use the colors of the highest vibrations in their purity. They should always be subdued, as if by the intervening atmosphere, otherwise we should receive nothing but the idea of color.

Each room must be decorated according to its use, and the impression it is intended to produce upon the mind. A library should be quiet, orderly, dignified, and mentally stimulating. As thoughts flow more freely in the dimmer lights, a color of lower vibrations should be chosen, such as the duller tones of orange, which are the shades of dead grass and leaves, the autumn colors. The furniture is darker brown, and should never be light, for that would strike the eye and arouse the objective mind, not the subjective sense. These are good wall colors for offices in their lighter tones, more dull yellow than orange, and a drawing-room with a wall of old gold will please people whose pleasure it is to converse rather than gossip.

The music-room might be done in blue, as a color stimulating to genius, soft, dull grayish blue, like the sky on a moonlight night. The furniture could be blackish walnut, or ebony, and it could be lightened by dull silver, in panels or decorations. In such a room a musician would be inspired.

The dining-room can afford to use tones of red, but never deep red. There is Pompeian red, which is a combination of pink and brick red, beautiful, under some conditions a wonderful background for the gold-decorated china and glassware, or the silver on the sideboard. A pronounced green has a little too much of the inspiring effect of blue in it to be a good color for a dining-room, but a dull greenish brown is good. So, too, are all the lighter shades of leather. The material used is of little importance, except as it gives the desired effect. Cloth, paper, leather, paint, or calcimine all have their good points, and each is best under certain circumstances. If there is a pattern in the cloth, or paper, it should not be of a contrasting color. It should be in the same color, or a similar shade, so as to give an effect of one general tone.

Such colors as are mentioned were difficult at one time to find in papers and almost as much so in fabrics, but each year the tendency of the manufacturer has been toward better and more subtle effects. In large cities, where the goods of all the world are for sale, almost anything can be bought, and in the Japanese stores are usually found the most delicate and beautiful colors. But if these sources are not at your disposal the easiest and most effective form of wall decoration is calcimine, and it has numerous advantages over all other things. It is cheap, hygienic, has depth of tone, and unlimited range of color.

The mixing of color should never be left to the workman, and it is just there that the secret of success lies. You cannot describe colors; you can only produce them, and the only way to do that is to take the workman with his bags and cans of dry colors into one of the rooms of least importance where you wish to experiment and mix them yourself and test them on the wall. When the color goes on it is wet, and several shades darker than after it dries. The experimenting can also be done on a sheet of white paper which dries very quickly, but that is not so satisfactory. You may not be an artist, or even artistic, but you know what you want. The time is certainly not wasted. Paint is capable of more delicate treatment than most people imagine. After it has been put on, if it is gone over and barely touched with the bristles of a stiff brush (you might describe it as being patted with a scrubbing brush); it removes all shine, and leaves a soft surface of apparent depth.

Much can be done with very commonplace material. I know of one drawing-room in a beautiful country house in the middle west, whose owner was not satisfied with any of the ready-made materials at hand, so he covered the wall with manilla wrapping paper (it having the desired tint). It harmonized with the mahogany woodwork and furniture, and the brown tones in the rugs and hangings. In this same house the living-room, which had a floor made of enormous flat stones from the bed of the creek near by, had its walls modeled in relief in that first rough coat of plaster which is put on before the white coat, and harmonizes with stone. All contrasts in a room should be effected by means of the furnishings. A picture can scarcely be seen on a wall covered by an obtrusively patterned wall paper.

All this affects the so-called public parts of a house; but the upper rooms can be treated differently. There, the same rules of neutrality in color or harmony apply, but the feeling is more personal.

The young girl's bedroom would naturally be either blue or pink, according to her preference, but those two favorite colors may be made either commonplace and crude, or remarkably and unusually beautiful.

Take a shell pink, for example, and imagine it at a distance, with an intervening haze. It would assume a grayish tint, and be gently reminiscent of the cloudy sunset. Not being bright, it would not detract from the fresh rosiness of youth, yet it contains cheerful warmth and beauty. A college girl may find more enjoyment in shades of blue, and blue-green, while the mother would take pleasure in being surrounded by delicate tints of pale mauve and old violet.

Ceilings can almost invariably be done in shades of cream and pale yellow, as these colors seem to reflect the light best and be least noticeable.

In rooms with low ceilings the wall decorations should extend completely to the top, thus giving the effect of height, but where the ceiling is very high it can be allowed to usurp the wall space to the extent of several feet, which gives the effect of freedom and openness to a room. Borders usually distract the eye, and ruin the simplicity, so they should be avoided. The molding can be either the color of the ceiling, the wood-work, or of the picture frames.

Walls should never be dark, either in actual color or effect, neither should they be too light. A sympathetic neutrality tempered by each person's individuality is the result to be desired.—House Beautiful.

* * *

What is "Marble"?

A CORRESPONDENT of a contemporary writes to know the legal definition of the word "marble." The editor of Stone replies to the query as follows:

"A more difficult question could scarcely be asked, and it is impossible to give a thoroughly satisfactory answer. There is no exact, legal definition of the word marble, and the matter is one that has frequently been in dispute. Various lawsuits have grown up around the question, and experts have been called to testify. With all of their ingenuity they have been unable to build up a definition that will stand all tests. The trouble, of course, is that 'marble' is not a scientific geological term, but is purely a trade or literary word. The dictionaries do not succeed any better than the stone experts. Under the heading 'Marble,' the Century Dictionary gives the following definition: 'Limestone in a more or less crystalline or crystalline-granular condition. Any limestone, however, even if very compact or showing only traces of a crystalline structure, may be called marble if it is capable of taking a polish, or if it is suitable or desirable for ornamental and decorative purposes. The presence of magnesium carbonate associated with the calcium carbonate, forming dolomitic limestone or even pure dolomite, does not in any way influence the nomenclature of the rock.' Under the heading of 'Limestone,' the same dictionary says: 'Marble is the name given to the more crystalline limestones, and especially to such as are solid and handsome enough to be used for ornamental purposes or in costly buildings.'

"The Standard Dictionary, under the heading 'Marble,' says: 'A stone composed mainly of calcium carbonate or of calcium and magnesium carbonates, of such color and texture as to be of value for building or for ornament.' Under the heading 'Limestone,' the Standard has the following: 'Although there are no chemical differences, it is customary to call those limestones possessing especial value in fine building or decorative work

"marbles," and the ordinary dull-colored non-crystalline and oolitic varieties, suitable only for building and lime-burning, "limestones."'

"One of the most satisfactory definitions is from the Encyclopedia Britannica. This declares that 'marble is a term applied to any limestone which is sufficiently close in texture to admit of being polished. Many other ornamental stones—such as serpentine, alabaster and even granite—are sometimes loosely designated as marbles, but by accurate writers the term is invariably restricted to those crystalline and compact varieties of carbonate of lime which, when polished, are applicable to purposes of decoration.'

"It is apparent to any experienced stone man that these definitions leave much to be desired. According to the classifications given, many stones that are indubitably limestones would be included among the marbles, and some stones that are always included among the marbles could hardly be admitted to such a category. For instance, to take the Standard definition, as 'possessing especial value in fine building or decorative work,' this would bring Bedford oolitic limestone into the class of marbles, for no marble has had wider use in fine buildings and in exquisite decorative work. There are certain varieties of stone that almost defy classification. Such are the Istrian and Hauteville stones, which are called limestone or marble, according to the taste of the user. They are of delicate color and take a good polish, but are free from crystallization. They are used in the very highest class of decorative work. Even the United States Government, through its customs department, is unable to give a satisfactory classification, with the result that there have been constant disputes over duties.

"If the leading authorities have thus failed to give definitions that are perfectly satisfactory, it may be presumption to make an attempt in these columns. But the question has been put to us, and should not be avoided. Something may be accomplished by going rather more deeply into particulars. The definition we should suggest is as follows: Marble is a term rather loosely applied to various forms of limestone. In general, the word is restricted to varieties of limestone that are crystalline and capable of taking a good polish, but there are many exceptions. A structural marble is a crystalline limestone of white or delicate and lively color, or it may even be a pure dolomite. Decorative marbles are those limestones that are useful for ornamental purposes by reason of delicacy of texture, beauty of color, liveliness and ability to hold a polish. They are almost invariably crystalline in formation. Varieties of calcite that may be polished and that have beauty of coloring are frequently called marbles, but if there is an absence of crystallization the use of the term is not approved by careful writers. Calcite that has not undergone metamorphism lacks the liveliness and luster demanded of a marble, and its polished surface soon becomes dull.

The way to test such definitions is to apply them to the varieties of stone which give most trouble in classification. The United States Government is frequently tempted into illogical and unjust action in its effort to bring various articles under the most highly taxed schedules of the tariff regulations. It is this that is responsible for its endeavor to class certain foreign limestones, like Istrian and Hauteville stone, as marbles. The Government finds its justification in the fact that many stone dealers, who like sounding phrases when they sell their material (even if they decry them when entering an import), freely call these stones 'marbles.' Secondly, the Government argues that the stones take a polish and are used in a high class of decorative work. But under the above definition we believe

that these stones would fall into what we hold is their proper classification,—that is, limestone. Beautiful as they are, the absence of crystallization prevents even the polished surfaces from showing the liveliness and luster of a true marble.

"The case of the structural marbles is more difficult. There are many stones that are conceded by all authorities to be marble, and yet that will take only a dull finish despite their crystalline nature. We cannot think of any surer distinguishing marks than liveliness and delicate color. These would, we think, exclude a purely crystalline limestone such as, for instance, the famous Irish limestone. While this is one of the best of structural stones, it cannot be called 'lively,' but is sombre in color and effect. And yet the above tests would freely admit into the category of 'marbles' the unfading blue stone produced in Montgomery county, Pennsylvania. This is dark in color, but it has an undeniable sparkle and luster.

* * *

Strength of Red and Yellow Douglas for Bridge Stringers

THE terms red and yellow fir are not thoroughly defined. By some, only close-grained, bright yellow sticks are designated yellow fir and all other sticks called red fir; while others call only coarse-grained sticks of a pronounced red color red fir and all other material yellow fir. Both red and yellow fir are secured from the same species, Douglas fir, and often from the same tree.

An analysis of the strength tests made by the Forest Service on Douglas fir bridge stringers is shown in the attached table. These stringers were graded according to the export grading rules of the Pacific Coast Lumber Manufacturers' Association, and in the table are grouped by grades. In classifying the stringers according to color all timbers of a reddish tinge were called red fir and all of a yellowish tinge were called yellow fir. The rings per inch shown in the table indicate that yellow fir is of a slower growth than red fir. It also ranges higher in grade. Of the 94 yellow fir stringers tested 47.8 per cent were selects, 40.4 per cent were merchantables, and 11.8 per cent seconds. Of the 162 red fir stringers tested 29.8 per cent were selects, 43.8 per cent were merchantables, and 26.6 per cent seconds, but, grade for grade, these tests show that there is practically no difference in the strength and stiffness of red and yellow fir in bridge stringer sizes.

STRENGTH OF RED AND YELLOW DOUGLAS FIR BRIDGE STRINGERS

(Yellow Fir Expressed in Per Cent of Red Fir)

KIND OF FIR	GRADE	NUMBER OF TESTS	RINGS PER INCH	PER CENT MOISTURE	WEIGHT PER CU. FT. IN POUNDS		FIBER STRESS AT ELASTIC LIMIT	MODULUS OF RUPTURE	MODULUS OF ELASTICITY
					AS TESTED	OVEN DRY			
							Lbs. per sq. in.	Lbs. per sq. in.	Lbs. per sq. in.
Red	Select	48	10.3	29.6	38.2	29.5	4427	6974	1645
Yellow	"	45*	17.5*	87.0	94.0	97.0	101	96	100
Red	Merch.	71	9.0	29.7	35.9	27.7	4056	6019	1534
Yellow	"	38*	16.4*	90.0	97.0	99.0	101	102	97
Red	Seconds	43	7.5	27.4	35.7	28.0	3674	4923	1319
Yellow	"	11*	14.5*	98.0	104.0	105.0	99	106	98

* Not Expressed in Per Cent.

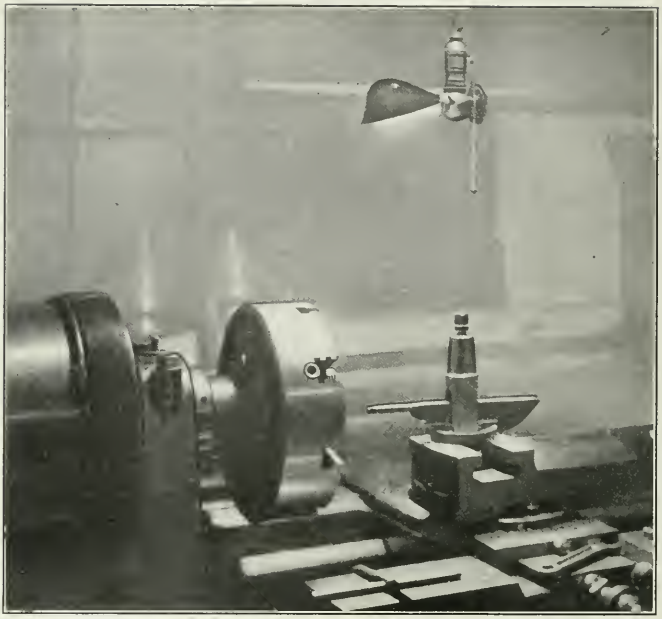


Fig. 1—Lathe Lighting with an Outside Balance Socket and a Steel Reflector

Machine Shop Lighting*

THE very little attention which has been given to artificial lighting in industrial plants is doubtless due largely to the lack of efficient lighting accessories. For years the only shades available for incandescent lamps have been the flat and 10-inch cone shades, neither of which did much to shield the eyes of the workmen from the glare of the lamp. A skilled workman's value as a producer is dependent on the tools which he uses, and good light is one tool he cannot dispense with. Since the light is provided primarily for his use, that he may perform his work with maximum efficiency, it follows that it should be suited to his needs.

With the flaming and intensified arcs now available, and particularly since the advent of the tungsten lamp, it is possible to secure the required illumination of almost daylight quality, at even reduced cost of current, as compared with the inefficient and costly installations of the past. With many classes of industrial service the high candlepower tungsten incandescent lamps, equipped with prismatic or properly designed metal reflectors, are admirably adapted because of their steadiness, white light, efficiency, simplicity, and low cost of operation. Glass and steel reflectors giving several distinct types of light distribution have been designed especially for

*Condensed from an article by E. B. Rowe in the Iron Age, April 21, 1910.

Fig. 2—Correct Lighting of an Emery Wheel

use with tungsten lamps of the various sizes now on the market, and by selecting the proper reflector, as determined by the height or spacing of the lamps, an illumination of the required intensity and uniformity can be obtained.

While always of great importance, general illumination, particularly in machine shops, is not so vital as the local lighting of each machine. Here direction is often as important as intensity. Figure 1 illustrates a special socket and reflector which will satisfactorily meet all such requirements. In the position shown, the light is thrown strongly downward, while for boring or similar inside work it is simply necessary to lengthen the drop cord on the adjuster and stand the lamp on the most convenient part of the machine, preferably the carriage, using the flat plate shown at the right of the socket as a rest. The lighting of an emery wheel is of considerable importance. The light unit must be placed so that not only the face of the wheel, but both edges near the face, can be properly lighted. Figure 2 shows one method of doing this. An 8-candlepower lamp is often used, equipped with a Holophane steel reflector of the parabolic type, with the

extension holder, which brings the lamp in such a position in the reflector that extreme concentration of the light is obtained. To secure the proper lighting of the two faces of the wheel this machine was equipped with an upright iron rod, and at the top of this upright a short horizontal arm was attached, so that a little lateral movement could be obtained, thereby enabling the light to be thrown on either face as desired.

The saving in current consumption from this equipment is also an item to be considered. With the probable increase in effective illumination of several hundred per cent secured from this equipment as compared with a bare 16-candlepower lamp, a decrease in energy consumption of exactly 50 per cent is secured by using an 8-candlepower carbon lamp. Under certain conditions a 4-candlepower lamp would give all the light needed, in which case the reduction in current cost would be 75 per cent.

The same increase in illumination and saving in current can be effected in a multitude of ways in machine shop lighting. For example, figure 3 illustrates a simple home-made adjustable arm used for bench work. In this instance the extension cord is tied to the end of the arm, and while purely a makeshift it is none the less satisfactory. The lighting equipment shown in the illustration consists of a 16-candlepower lamp in a Holophane steel reflector, which is similar to the one shown in figure 2, except that the holder is attached in such a way that the reflector hangs at an angle of 15 degrees from the vertical, throwing out the strongly concentrated beam of light at a corresponding angle from the vertical. This enables the lamp to be placed back of the work, so that it is not in the workman's way, and yet

Fig. 3—Good Bench Lighting

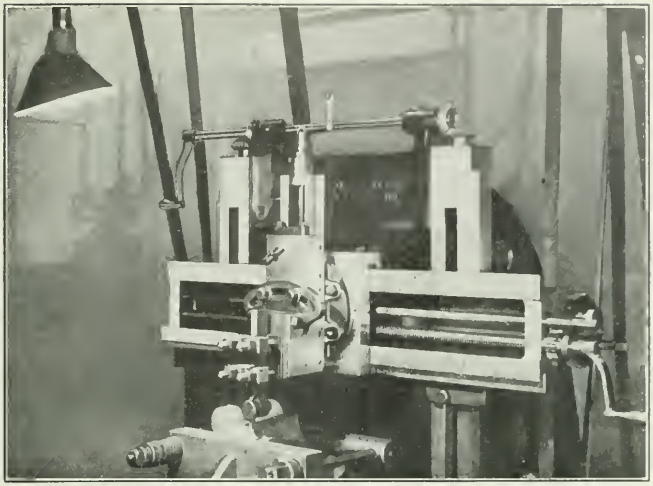


Fig. 4—Good Illumination of a Planer at Low Cost

throws the maximum amount of light on the work. The remarkable concentration which this reflector gives is clearly shown in the illustration, in which the only spot strongly lighted is the casting.

One of the hardest machines to light correctly is the planer. The requirements here are two-fold: First in setting up the work, and secondly, at the cutting tool. Figure 4 shows one method of lighting both the bed of the planer and the cutting tool from one unit. The remarkably good illumination shown in the engraving is obtained from a steel reflector and a 40-watt tungsten lamp.

When one stops to consider that the cost of this lamp per hour is approximately 30 per cent less than the ordinary 16-candlepower carbon filament lamp, the high intensity obtained on the work is truly remarkable, and is strong evidence, not only of the high efficiency of the tungsten lamp, but of the reflector as well.

* * *

One on the Plumber

A plumber up in Pennsylvania willed to his brother a certain repair job he had in the house of a rich man. In his will he expressed the regret that he could not leave more to this relative, but said by proper management this job should keep his brother from want during his life time.

* * *

Bricks from Ant Hills

Excellent bricks are made, it is said, of the soil of ant hills in Central Africa. The natives tread it with water into a dough like substance, which is shaped in rough wooden molds. It is then dried in the sun, and afterward baked in native kilns.

MacDonough Building, San Francisco *MacDonald & Applegarth, Architects*

The Strength of Reinforced Concrete

By KENNETH MACDONALD, Jr., Architect.

SINCE the San Francisco earthquake and fire, and during the reconstruction of the city, we have been gradually coming to the full realization of the advantages of a reinforced concrete building.

Compared to Class C constructions: It is only 5 per cent more expensive and has a rate of insurance 50 per cent less. Therefore the saving in insurance money will pay the interest on the difference several times over. Cement exterior walls six inches thick offer a saving in floor space of from 6 to 15 inches around the entire perify of the building.

Compared with steel frame buildings: It is from 15 to 20 per cent less expensive than a steel frame. It has a greater fire resistance and is usually of a greater strength because it has a larger factor of safety.

The United States government report on the San Francisco earthquake and fire, which was issued immediately after the disaster, states in part as follows:

"Owing to the labor conditions in San Francisco at the time of the disaster, but few concrete buildings had been constructed. Of these, the Bekins Van and Storage Warehouse gives a striking example of the fire resisting capacity of this form of construction."

This report is filled with such tributes to reinforced concrete. One statement, in particular, compares it with steel and all other forms of construction in summarizing the result, as follows:

"Of all the structures which were manifestly subjected to the San Francisco earthquake and fire, the reinforced concrete buildings stood the best."

Who has seen this report? No one except those to whom it has been specially shown to demonstrate the facts. This is due in part to the great capital which has been invested in the steel industry. As concrete becomes understood the steel frame will be forced backward.

The rapid growth in the production of first rate local cements in California will aid materially in increasing the use of reinforced concrete and will give our investors the opportunity to get exactly the same rents as can be obtained from a steel frame structure and put from 15 to 20 per cent of the money back into their pockets and put about 40 per cent of the cost of the building into circulation in our State, instead of giving it to the eastern cities that roll steel beams.

The advocates of concrete are frequently asked: How can you state that concrete buildings without any steel can be as strong as a steel frame? No one claims that without the steel any strength greater than a brick wall of equivalent proportions could be obtained. Probably 25 per cent of the people in California are not aware of the existence of the reinforcing steel. Ninety per cent are unjustly influenced by the advocates of steel construction who are not equipped to design in reinforced concrete.

A prominent bank in San Francisco refuses to loan money on reinforced concrete. This is no reflection on the form of construction, but is a joke on the bank.

In one instance, this bank, after refusing to loan on a reinforced concrete building readily consented to make the loan when the building was apparently changed to steel.

This fabric was passed off as a steel frame and the money was loaned. This frame would not have held the ordinary live loads which were to have been imposed upon them. Only after the concrete had been poured around them and they had been made into reinforced concrete beams, were they of any use.

The investor in a building doesn't seem to realize that the amount of money he puts into a structure is of equal importance to the rent which he gets out of it on determining the merit of his investment. Our greatest industrial institutions, manufacturing establishments, etc., have realized, however, the necessity of economy in their buildings. They want a strong building, they want a fire-proof building, they want a building which needs little repair, they want an economically constructed building. They therefore appoint committees to travel throughout the world and to determine what type of buildings they should put up. I say, without fear of contradiction, that wherever this has been thoroughly investigated, reinforced concrete has been the result.

Recently in eastern cities there has been a distinct increase in the use of reinforced concrete, even in instances where no economy is necessary. One of the largest recent groups of buildings are those being built by the United States government, known as the West Point Military Academy. No one will deny that the supervising architect of the United States is in a position to judge of what is best.

The State educational building in Albany, which is in the course of construction under the supervision of Palmer & Hornbostel; seventeen buildings, comprising the United States government hospital on Ellis Island, by James Knox Taylor, supervising architect of the United States; the Pierce Automobile Company, the Thomas Automobile Company, the Packard Automobile Company, and the great majority of the smaller automobile works are building all of their buildings in reinforced concrete. The Automobile Club of America, by Ernest Flag; the New York, New Hampshire and Hudson Railroad Company station, by Cass Gilbert; Christ Church, by Cram, Goodhue & Ferguson, the library, the hall of chemistry, the stadium and many of the lesser buildings of the Syracuse University; in fact, all of their buildings of recent years are concrete.

At West Point Military Academy the following buildings are of concrete: Cadet barracks, by Cram, Goodhue & Ferguson; post quarters, military academy, artillery and cavalry barracks, bachelor officers' quarters,

MacDonough Building, San Francisco, Showing Floor Tests
MacDonald & Applegarth, Architects

MacDonough Building, San Francisco, Showing Floor Tests
MacDonald & Applegarth, Architects

branch post exchange, new post headquarters, gymnasium and chapel, battalion guardhouse, chaplain's quarters and four officers' quarters, all by Cram, Goodhue & Ferguson.

If one-half the concrete buildings which are being constructed at the present time were listed in this article, this magazine would be filled with them; in fact, almost every great enterprise constructing a number of good substantial buildings takes advantage of the great saving presented by concrete.

Some of the steel buildings recently constructed in New York City have shown a thick formation of rust on the beams where the moisture has been allowed to creep in. A bright, unpainted reinforcing bar can be embedded in concrete and will remain bright and rustless for an indefinite period.

Objection to concrete: How can you take a concrete building down? This will remain problematical until it is tried, and should be little more trouble than tearing down a steel building whose floors and curtain walls are of reinforced concrete.

The reinforced concrete railroad tie, the fence post, large sewer pipes, and innumerable other applications of reinforced concrete are rapidly coming to our notice and are destined to gain in popularity.

When a successful removable form is invented and the present expensive form work is abolished, we will see these fire-proof Class A structures put up for less than the half-wood Class C structures, and there will be no reason why our city cannot be made fire-proof.

The cut showing the MacDonough building floor tests is a demonstration of the strength of reinforced concrete.

These floors were designed to carry a load of 150 pounds per square foot of superficial area. Eight hundred and fifty pounds was gradually placed on a span of this floor, as may be seen by the cut. An instrument for measuring the deflection was constructed on the floor below. This floor was designed with a factor of safety of 4, thus at 600 pounds, allowing a stress of 16,000 pounds per square inch of reinforcing steel, we should have reached the ultimate strength of the beam. Knowing, however, that considerable deflection would be necessary before the dangerous point was reached, we increased the load to 800 pounds. The deflection with this load, 30 per cent more than should develop the supposed ultimate strength of the beam, showed a deflection of only ⅛ of an inch. From 1,200 to 1,500 pounds per square foot could be placed on the floors of this building without causing a failure. The report of this test by Smith, Emery & Co., is as follows:

"We inspected on August 8th load test of floors and columns in your building at Front and Market streets.

"We found that no appreciable deflection had occurred, although the test was more severe than is customary. The building is well designed, and is a good example of concrete construction."

It would be intensely interesting to see what would happen to the floor of a steel building designed for 150 pounds per square foot if subjected to this load. The basement columns were designed to carry 148 tons. By grouping bags of cement covering one-half the span between the columns on each of the five floors in a tier, a load of 244 tons was thrown on to the basement column. A deflectometer which multiplies the deflection seven times registered no settlement whatever. It is unnecessary to state that this was surprising, as a deflection was unquestionably expected under this severe load.

Attention is called to the fact that each sack of cement weighs 100 pounds, and covers 2 square feet of superficial area. Therefore, by multiplying the number of sacks in height by 100 pounds and dividing by 2, the reader may ascertain the load per square foot from the accompanying photographs.

Among the Architects

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San Francisco Architectural Club

The San Francisco Architectural Club is now comfortably ensconced in its new home in the Cordes-Rochat building. The club has received many compliments for its enterprise in placing the competitive drawings of the Oakland city hall on exhibition in the Mechanics' Institute building. Many people enjoyed the exhibit, including practically every architect in the trans-bay region.

The club has elected Albert L. Lepachet treasurer, and H. E. Nye and W. D. Sherman have been added to the board of directors. A prospectus recently has been issued, from which the following information is taken:

The objects of this club are:

To cultivate among the people a better appreciation of the work of the architectural profession.

To advance the knowledge of architecture and the allied arts, with a particular reference to the betterment of the educational opportunities of the younger men preparing to practice the profession.

The membership is composed largely of young men of the city who are actively preparing for the practice of the architectural profession, the majority of whom are employed in the various architectural offices of the city.

The majority of the prominent architects of San Francisco are members of the club. They heartily endorse our worthy purposes and it is through their support and co-operation that the club is able to offer a splendid opportunity for the educational advancement of architectural draughtsmen.

At the present time the following classes are being conducted under the auspices of the club:

Class in Rendering—A. G. Headman, instructor.

The Atelier—Patrons, John Bakewell and George W. Kelham.

In the atelier, or class of design, the general problems in planning and designing of the Beaux Arts Society of New York are given, with supplementary lectures and discussions.

The class in architectural history is also in charge of A. G. Headman.

The class in structural engineering is in charge of Charles Derleth, Jr., dean of the College of Civil Engineering at the University of California.

Other subjects in the course of preparation are: Outdoor sketching and water color work, pen and ink rendering, drawing from cast and life, talks on the preparation for college work, and notes on foreign travel and study.

Also, from time to time, lectures are given by experts and specialists in their various lines on subjects of vital interest to the architectural man, such as testing of materials, the various building trades, building superintendence, estimating, detailing, general office practice, systems, ethics of the profession, etc.

Another Exhibition for Los Angeles

The Los Angeles Architectural Club will hold another exhibition this fall, in connection with the second annual convention of the Architectural League of the Pacific Coast. The work to be shown this year will include drawings and sketches never before put on public display, and will be restricted to Southern California architects. The year following, it is planned to have another large exhibition similar to that of last fall.

At the last meeting of the club Elmer Grey gave some entertaining reminiscences of his trip to Mexico and Europe, telling many humorous incidents.

Draftmen's Employment Bureau

A new department is to be inaugurated by the Los Angeles Architectural Club for the benefit of architects and draftsmen. The department is a free service along the lines of an employment bureau, and is designed to both find employment for draftsmen looking for positions, and supply qualified draftsmen for positions open.

The club has organized its bureau along the following systematic lines:

A draftsman seeking a position is required to send or give to the secretary of the club his full name, postoffice address and telephone number, information regarding his training (school or office), his experience (office and field), his specialty (design, construction or general), if any, salary (earned or expected), references and position wanted. This information, properly classified, will be placed upon cards which are kept on file by the secretary. To this card catalogue he refers upon receipt of inquiries for draftsmen. Architects and others needing draftsmen are requested to send detailed information covering their requirements to the secretary, Mr Henry Edgar Bean, 921 Central building, Los Angeles, who will attend to the matter promptly.

While this department was inaugurated for the benefit of members of the Los Angeles Architectural Club, applications from non-members will be accepted and catalogued as described above. The benefits of the department or bureau are not limited to those who may be open for immediate engagement, but can be extended to those seeking to enter broader and better lines of work than those in which they are now engaged.

San Diego's New Theater.

San Diego is growing in population, wealth and importance. With her growth has come steadily increasing activity in the building line. The city is rapidly building new homes, both of modest and the more pretentious character, and imposing business blocks. Now the city is to have a modern, completely equipped and handsomely decorated play house.

Contracts have been let for the building, from plans by Architects Quayle Bros., and is to cost about $115,000. The theater auditorium is planned with a seating capacity of 1,500 persons, the main floor seating 900 and the balcony 600 spectators.

There are large lobbies, women's parlors, smoking-rooms for men and other up to-date features. A steel curtain will separate the stage and auditorium when the acts are not in progress. The interior decoration will be elaborate and [illegible] character. One feature of the interior finish will be the arrangement of the electric lights, which will be concealed in the walls and ceiling behind [illegible] beveled glass and mirrors.

July Meeting of San Francisco Chapter, A. I. A.

THE regular quarterly meeting of the San Francisco Chapter of the American Institute of Architects was held at Tait's Cafe on Thursday evening July 21st. After dinner, the meeting was called to order by the president, William Mooser.

Messrs. Henry Hornbostel, S. W. Jones and Hunter were present as guests of the Chapter.

Mr. T. J. Welsh, for the committee on publicity, submitted a written report, calling the Chapters' attention to the large number of contracts reported with no mention of architects. He stated that if the whole or a part of this work was performed by regularly certificated architects, it would be a great benefit to the profession and also to the public. He called attention to the poor character and in many cases miserable construction of the buildings designed without the assistance of an architect, and mentioned the fact that whole localities had been ruined by this class of building, and that many buildings erected within the last few years have already fallen into decay and ruin, owing to the poor design and construction originally employed. He further stated that if these buildings had been built honestly and in an artistic manner, they would have assisted in beautifying the city and there would have been no cause for complaint either from architects or owners. He suggested that owners and real estate men in San Francisco be educated to these facts, and further referred to the statistics for the month of May, which were compiled by Mr. Deane, secretary of the State Board of Architecture, as follows:

Certificated architects	$1,379,553.00
Non-certificated architects . .	766,902.00
No architect	719,764.00
Business in May, 1910. . . .	$2,866,299.00

Two hundred and forty certificated architects practicing in San Francisco, 48 per cent of the work.

Communications were received from the Admission day festival committee, requesting a subscription from the Chapter; from Glenn Brown, secretary, A. I. A., regarding subscription to the McKim Memorial fund; from the Santa Cruz Portland Cement Company, two communications inviting the Chapter members to visit its plant at Davenport, and a letter from Knox Taylor, supervising architect of the treasury, to Senator Perkins, a copy of which had been sent to Mr. Mooser, stating that the subtreasury building in San Francisco would be the only building in this vicinity which would come under the Tarney act.

Mr. Henry Hornbostel, of the firm of Palmer & Hornbostel, the successful architects in the Oakland city hall competition, was introduced by Mr. Mooser and addressed the Chapter at some length. Mr. Hornbostel stated he was pleased at the reception and good will shown, and was glad to see that the architects of San Francisco are sports. He said it was hard to be a sport when things are against you. To either win or lose in a competition is a truggle; and it was delightful to receive congratulations, and the spirit shown does not exist in all cities. Mr. Hornbostel's experience was that this was true only of New York and San Francisco.

To Mr. Hornbostel's mind, the history of competitions show two things. The average architect was only able to do one thing at a time, and it was given to but few people to be able to do two things at a time and do them successfully. One man is able to obtain work through his friends, relatives, influence and social connections, which method would be classed as a matter of personality. The other method does not depend upon personality—it depends entirely upon ability and study. Speaking from personal experience, Mr. Hornbostel stated that in his entire practice he had had five buildings through friends—all other work had been through competition.

He explained his success in competitions by stating that he had spent five years at college, four years abroad and twelve years in practice, during which time he had been a teacher continuously, part of the time at Columbia and part of the time at Pittsburg, conducting an atelier, and had a great number of students pass through his hands during that time. In fact, in the recent Oakland competition, five of the competitors were former students of his. During all this time he had specialized on competitions, and therefore he ought to have stood a good show. The greatest benefit an architect can obtain from teaching is absorbing the ideas developed in the atelier. The students do many foolish things and many things equally good, under proper direction. The teacher is bound to absorb some of the spirit from the young men; and if for no other reason, it pays to teach.

In a competition many ordinary solutions are submitted, well done. Mr. Hornbostels' idea was to submit a solution which would either be successful from its newness and compel attention or else be immediately discarded. With this sort of practice, a man does not need social life—he can give his whole time to study. Naturally, as many competitions are lost as won, under these conditions.

The following resolution was introduced by Mr. Curlett, duly seconded and carried:

Whereas, The American Institute of Architects, having for years endeavored to secure the endorsement of a high standard governing the conduct of competitions for public and other buildings in general, and

Whereas, The Oakland city hall competition having been conducted along the lines advocated and endorsed by the American Institute of Architects, and the Oakland Board of Public Works being the first in this State to initiate the program as adopted by the Institute, be it

Resolved, That the approval and congratulations of the San Francisco Chapter of the American Institute of Architects be extended to the Honorable Mayor and Board of Public Works of the city of Oakland, Cal., for the highly creditable and commendable manner in which the competition was conducted.

Praise for San Francisco Homes

Dr. Wilbur F. Crafts, a prominent clergyman of Washington, D. C., upon a recent visit to the Pacific Coast, took occasion to eulogize the beautiful homes of San Francisco and vicinity:

"The average traveler stopping off in San Francisco for a few hours of sightseeing makes for Chinatown, and sometimes sees little else. I have been four times in San Francisco and have not seen Chinatown. I am content to accept the word of others as to its moral ugliness. But I have found the beauty spots of your city—something that corresponds to the grand canal of Venice, only your outdoor art gallery of beautiful homes has more beautiful setting. It has been said by an art critic that a picture or statue by itself is but a fragment torn from its proper setting, and that the highest expression of art is a building—a temple or a home—fitly decorated within and set in artistic grounds.

"Let us revise this by saying that a whole street of beautiful homes, thus fitly decorated and set in a frame of lawn and flowers and trees is the consummate work of art. Nay, we must make one more provision—that is these beautiful homes here shall be beautiful human lives, for noble living is the finest of fine arts.

"Your homes have one advantage over those of Cleveland, in that yours are set on hills of splendid outlook, and you excel the homes of Pittsburg in the royal palms that stand like Jacin and Boaz before your doors. If you would draw easterners for a fair or for citizens, let your Chamber of Commerce, instead of putting sky-scrapers in their prospectus, in no way different from those of St. Louis and Chicago, send out pictures of Pacific and Jackson streets and Van Ness avenue, and of Burlingame or Berkeley Heights."

Work of the Home Industry League

The Home Industry League of California is doing good work for the encouragement of home industry. R E Queen, a member of the league, and head of the California Syrup of Figs Company, attributes the present dullness of our manufactories to unsystematic advertising He says, along this line:

"The question of bolstering up Western confidence in Western products has become one of general interest. All members of the community are suffering from the unreasonable partiality shown goods of Eastern manufacture Thousands are unemployed in this state because the sales of California made articles have fallen off.

"If the California manufacturers want to increase their sales, encourage the investment of outside capital, add to the prosperity of the community and establish a fixed and dependable market for goods of Western manufacture right here at home, they must wage a wide and systematic advertising campaign through the medium of the newspapers and magazines to educate the people on the importance of their support."

At a recent meeting of the league J. A. McGregor, president of the Union Iron Works, urged sending a communication to President Taft and cabinet officials in regard to letting to the Union Iron Works the contract for a giant dredger to be used in Panama. Three bids for the dredger have been received by the government. One is from a Scottish company, another from an American branch of an English company, and the third from the Union Iron Works

The local bid was $800,000, twice as high as either of the other two. This was explained by the fact that local labor costs three times as much and local material double. A committee was appointed to draw up resolutions to be sent to the president

The officers of the league are: President, Fred C. Parker; first vice-president, Frederick J. Koster; second vice-president, A. C. Rulofson; secretary, J M Patrick; treasurer, L. Saroni, directors Edward L. Baldwin, A C. Boldman, R J. Davis, Zoeth S Eldredge, J. O Ganter, I. N. Hibberd, P I. Jacoby, George H Pippy, R. E. Queen, W. B. Webster, C J. Wetmore and B. J. Williams

Personal

Architect Norman F Marsh has moved his offices from suite 206 to Nos. 214 to Broadway Central building, Los Angeles

Architect Edwin Bergstrom is recovering from a severe operation for appendicitis. Mr. Bergstrom is junior member of the firm of Parkman & Bergstrom Los Angeles

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RESPONSIBILITY OF ARCHITECTS AND ENGINEERS

There is a pronounced tendency to be observed in many directions to withhold authority from architects, engineers and others, while demanding of them that they assume full responsibility for the outcome of the work in charge. A recent instance occurred in Tacoma, where the city engaged a responsible engineer to undertake the construction of a hydro-electric plant. The arrangement was that he should have full authority to engage his engineering assistants and fix their salaries, subject to the approval of the public works commission. Further, the arrangement was not to be cancelled without a two-thirds vote of the city council. A stipulation was included that the engineer was to be retained until the completion of the work. A change of the municipal administration brought in a new set of officials, who promptly demanded that the control of the work was thereafter to be with a commissioner, and also demanded that the engineer accept a reduction of salary to half the former figure. The engineer showed his appreciation of his position by refusing to accept any such conditions, feeling that the responsibility for the work demanded that he have the authority as well as the compensation. His attitude will appeal to most people as quite logical and reasonable. The council had the governing power retained to prevent making the work different or more expensive than was planned. But the real responsibility rests upon the engineer, and should it prove a failure, it is upon him that the blame falls. Under such circumstances, he is entitled to have control.

The same responsibility falls upon the architect, and when the owner seeks to curtail expenses by cutting the architect's commission, he need blame no one but himself if the building is a failure, for the architect cannot be responsible for the proper construction of a building that he does not personally supervise. The

trifling additional expense that the owner is called upon to pay an architect for superintendence is offset by the knowledge that the building has been put up right and in full compliance with the plans and specifications. An owner who balks at paying an architect his 5 or 6 per cent commission is the kind of man who invariably will buy poor material and alter the specifications to suit his miserly purse. The less the architect has to do with his kind the better for him professionally. Better, by far, that the architect lay off his draughtsmen and take a vacation, than accept work from a client for 3 or 4 per cent and have it turn out disastrous by reason of faulty construction and lack of competent superintendence, for even though the architect has had nothing whatever to do with the construction work, the fact that he made the plans cannot be overlooked, and in the eyes of the public is evidence of his unfitness and incompetency.

POPULARITY OF THE BUNGALOW

American architecture has been quick to avail itself of an Oriental device for household comfort coupled with reasonable economy; for the bungalow, if designed or adapted by western sojourners in the east, has appealed to the sense of the practical in the west. This type of dwelling is an evidence, in its increasing use, of the more general appreciation of the fact that the season of summer in the United States, even in normally temperate latitudes, brings with it in frequent recurrence, periods of tropical temperature. Its course has run against the sun, for the bungalow first came into popularity in this country on the Pacific slope, and thence, as stated in this magazine some months ago, won its way speedily across the continent. Naturally enough, the original plan has undergone adjustment to meet environment. The increase in the suburban habit, following better facilities of local transportation, has multiplied these residences within the zones of cheap railway fares surrounding large cities. They are numbered by thousands, for example, in Long Island, and they are multiplying in the readily accessible environs of Boston, Philadelphia and Chicago. The bungalow appeals as much to the housewife as to the husband. It combines the privacy of a house with the step-saving conveniences of the apartment. Taste counts more than money in making the bungalow attractive and economical, even though wealth may indulge in fanciful and costly variations. Among its peculiar attractions are counted broad verandas and interior living-room, which may be as lofty as the roof, with a surrounding gallery, giving access to bedrooms. Its popularity, concludes the Western Architect, is an evidence of the potent influence of the American woman upon the art as well as upon the cost of living.

SUB-AQUEOUS BRIDGES

Engineers the country over are wrangling as to the respective merits and cost of bridges and tunnels. Some insist upon bridges, and that tunnels cannot be added to, increased in capacity, are extremely costly to build and as costly to maintain; while others assert that bridges involve greater expense, are exposed to terrific strain and are more liable to accident. It seems as if the tunnel-men had the best of the argument, for the latest railway crossings of rivers have been via that means. The discussion is particularly hot in the French journals.

The best settlement of such matters is a compromise. In this case we also believe that the "compromise" is even better than either of the contestants, so to speak. We are in favor of "sub-aqueous bridges," dredged channels, sections of tube laid in these channels, or anchored to piers, the whole below the line of navigation, not subject to wind or wave action, yet not the expensive and deep boring necessary for a tunnel. The approach

grades at the ends need only be short, therefore inexpensive, and as traffic increases another tube can be added at less expense than the first was laid. It is the ideal way of crossing waterways. There is such a sub-aqueous bridge in operation in Paris, and the Detroit river "tunnel" is in reality such a bridge. But people are slow in adopting anything so revolutionary; it upsets all preconceived ideas, all precedents in water-crossing and, progressive as our engineers may be, it will be years before we see many such splendid crossings made.

Architect F. W. Fitzpatrick entertainingly described such a sub-aqueous bridge in the Architect and Engineer of August, 1909, being a suggestion for crossing into San Francisco. In greater detail the scheme was described in several numbers of the Engineering News of three years ago. Mr. Fitzpatrick and F. E. Strom were the original devisors and patentees of this mode of crossing.

And, by the way, those same two men seem to have the best claim to priority in the devising of the steel-framed building, the "skyscraper" structure of today, though Mr. Fitzpatrick laughingly admits that twenty-seven years ago people derided his idea of a tall building so much, thought him such a fool for suggesting it, that at times he felt half inclined to believe he really was a bit "off." Looking upon the thirty and forty-storied buildings of today he must feel that there is some satisfaction, if not much money, in the prophet business after all. The limit he suggested then was twenty-five stories, though he contended it was but a matter of proportion to go on indefinitely.

We clip the following from a particularly well posted journal:

> An interesting controversy has arisen over the credit for the origin of the skeleton steel frame building, precipitated by the recent death of W. L. Jenney, one of the leading architects of Chicago. The technical journals and many of the daily papers seem to be much perturbed over the question, which arose because friends of Mr. Jenney, after his death, hurried into print with the statement that he was the inventor of the skyscraper.
>
> There is no question that Mr. Jenney actually built the first tall steel-frame building in Chicago, the Home Insurance building. Others claim that that system was already thought of, but not used, by a great many architects and engineers. It is said that Burnham & Root prior to that time had planned a steel-frame building in Chicago, though it was not constructed in that manner. There are claimants for the honor in New York and elsewhere.
>
> The man who seems best to substantiate his contention is Architect Buffington of Minneapolis, who has United States foreign patents covering this construction, and actually has sued a number of architects and builders of skyscrapers for infringements of his rights.
>
> But the validity of the patents has been called in question. Architect F. W. Fitzpatrick of Washington asserts that he and an engineer named Strom planned several steel-frame buildings in 1883, while Fitzpatrick was chief designer in the Buffington office, and that they were designed with curtain walls in accordance with modern practice, but that the plans were not approved by Mr. Buffington, who, however, later had a change of heart and patented that mode of construction, borrowing the idea from Fitzpatrick without the latter's knowledge or consent.
>
> The question deserves the most careful sifting down. The skyscraper certainly has solved many of our modern economic problems, and whether the scheme of construction was the invention of any one individual, or, as contended by some, a natural evolution, a logical solution of the problems before them, a conclusion arrived at by many architects and engineers simultaneously, it seems that the architectural profession deserves greater praise (though the subject is so essentially an engineering one) for its introduction and perfection.
>
> While objecting somewhat to the adoption and patenting by another of his special ideas, Mr. Fitzpatrick, in a recent issue of a technical paper, holds to the idea that the steel-frame skyscraper, as a whole, is an evolution—a logical development from the needs of the time—and that while each of many men have had special ideas as to detail, the result was the outgrowth of the thought and work of all. This attitude is a credit to the man. He was only twenty when he designed the Buffington buildings, and he has designed and built many of the great skyscrapers of the country; besides which, he is recognized as the foremost authority on fire-proofing in the country, if not in the world.

HEATING AND LIGHTING

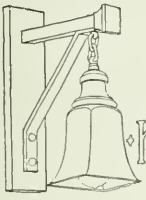
Plumbing and Electrical Work

The Lighting of School Buildings

ONE of the most important points to be considered in the planning of a school building is the lighting for the various rooms. This feature was taken up at the meeting of the Royal Sanitary Institute, held not long since at Cardiff, Wales, and in a paper read before that body by G. Topham Forrest, some rather valuable suggestions were presented. In the course of his comments, he says:

A combination of three requirements is necessary for the proper and efficient lighting of a school: (1) The selection of the site; (2) the requisites of the architecture and equipment, and (3) the teachers' duty. With reference to the latter it is important that the teacher bear in mind that he has an interest and responsibility in connection with each of the subdivisions. He may have no hand in the choice of the site or in the planning of the building, but unless he knows the principles involved he is almost certain to violate seriously the requirements of school hygiene as applied to the lighting of classrooms.

The value of high ground for the school site is inestimable. It insures good drainage and more light by reducing the height of the obstructions and giving a freer play to the sunlight, the influence of which secures immunity from dampness. The building should be placed so that it is possible for each child to see the sky from his desk. The control of trees should be secured with the purchase of the site. If they do not interfere with the lighting of the building, well and good, but this point should be carefully considered when inspecting suitable ground. The question of how to secure sunlight for all the rooms during some part of the day has led to considerable discussion as to the best direction for a building to face. Buildings should not be placed so as to coincide with the points of the compass, otherwise the north side room, if lighted on one side only, is cut off from the sun, while south rooms may get too warm in hot weather. To avoid this the building should face the middle points of the compass. By this arrangement each side receives the sun at some time during the day. A frontage of this sort makes southeast rooms most desirable, southwest next, then the northeast, and the northwest is least desirable, as the effects of the sun are only felt after the children have gone for the day. These distinctions however, must not be carried to an unnecessarily fine point, but when such a site can be obtained as readily as another it should be given the preference.



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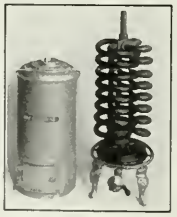
If a building is so planned that it is impossible to secure the sun for each room the deficiency should be made up by increasing heating and ventilation. Having determined the character of the building be careful to put the light in the rooms used for school work. This, of course, is the mandate of common sense, but how many times do we see that these considerations are not always regarded—e. g., assembly halls put on the south side, teachers' rooms monopolizing windows which should go to light classrooms, and staircases often to be found on the side of the building having the best light.

The relation of window space to floor space should be at least one to six; this ought to give the minimum of defective eyesight. Knowing the amount of window space required, as compared with the floor space, the next problem concerns the location of the light. Here two considerations are involved: (1) The full light must shine on the children's work; (2) the light must not be faced by pupils or teacher.

The conditions are fulfilled by adequate lighting from the left, and it must be borne in mind that light from the highest part of the room is the most valuable. That which comes through the lower panes goes to the floor. No shadows are cast by left-hand light. The light from behind, however, casts shadows on the books from the head and body of the pupil. Light from the right is obstructed by the pupil's hand, and there should be no light facing the pupil. For reading purposes, front lighting is exceedingly bad, as the light is thrown on the binding of the book instead of the page. Of all possible combinations of bi-lateral lighting that with windows at the left and right is to be preferred. This form of lighting is often seen in country schools. Also care should be taken that the lighting from the right hand should be shaded, leaving the chief source of illumination from the left. Light from the left and rear is particularly trying to the teacher, although from the pupil's standpoint alone the left and rear lighting is usually better than right and left, for, as a matter of fact, the children furthest away from the windows on the left get from that direction not only the light from windows on that side, but even the light from most of the rear windows comes to them from the left.

In furnishing a classroom, seats should never be placed close to the window; the last desk nearest the wall facing the teacher should always be in a line with the side of the window openings, and not placed in the shadow of the wall.

So many varieties of classroom windows are in vogue, both as regards design and construction, and having regard to the ventilation of the classroom, that it will be sufficient here to outline a few of



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the main principles which determine their use. It is well to remember when designing windows that the light should enter the room as a unit, so that there will be no distinguishing cross lights, no distinctly outlined shadows, and one light will shade into another without any visible lines. In other words, there should be broad piers or mullions between the daylight openings. On that account I am not an advocate of planning classrooms having only two windows, as this necessitates a considerable amount of wall surface between them. I am of the opinion that the best and most suitable form of classroom window for an ordinary sized classroom to accommodate, say, fifty or sixty children, is a three-light one, but it is hardly possible to construct brick piers of sufficient strength in a building of any height that will not interfere considerably with the light. Eighteen inches seems to be the width usually adopted, but as this width throws a shadow on the desks nearest the window, cast-iron mullions are I believe, now used, although I have not seen any. These are cast with heavy webs, and with the window frames bolted directly to them. In this way it is possible to put the windows sufficiently close and at the same time provide sufficient strength. When brick piers are used they should always be beveled on the inside.

The plastering should diffuse the light. It should, therefore, be tinted some very light color, almost white. Blinds are essential when a room is exposed to the sunlight, but these should never be made of heavy or dark material. Dark blinds will ruin the whole system of lighting. A light sage is a very good color, or cream.

When the style of window will permit the blind rollers should be hung at the center of the windows, each fitted with blinds, one being pulled up and one down, so as to screen the whole window.

In furnishing a classroom special care should be paid to securing school desks of practical construction. The eyesight of the pupils may be seriously impaired, the desks may be too high or too low, and the advantages of having a good building may be counterbalanced by this mistake.

Some little time ago the writer was called upon to report very fully on the question of adjustable desks for secondary schools, and some valuable statistics were volunteered by various principals, who all agreed as to the absolute necessity for grading the heights of the desks in a classroom to suit the pupils. In a classroom of a secondary school three different sizes are commonly met with, and, in my opinion, some such system would be advantageously applied in the furnishing of our elementary schools. The failure to adjust the desks to suit short-waisted children is a neglect of duty to care for the eyesight.

The architect's part in the remodeling of old buildings is an important one. A judicious application of the following questions might do good:

1. Are all obstructions, such as buildings, trees, etc., so dealt with that they will not deprive the children of seeing the sky?
2. Is light where it is wanted?
3. Is the ratio of window glass to floor surface one in six?
4. Are the windows on the left side or in such combinations that the children will not be compelled to face the light?
5. Are the tops of the windows more than six inches from the ceiling?
6. Have all large piers between the windows been done away with?

The defect of light from the wrong direction can be easily overcome by an adjustment of the desks. Left and front lights can be easily changed to left and rear, and right and front lights can be changed to left and rear, and so on.

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It has been stated that the most perfect architectural plants will not make the children immune from defective vision without a more decided co-operation of the teacher with the architect in his scheme for the lighting of the rooms. This is often shown in a careless and ignorant manipulation of the blinds, especially in the cutting off of high light or in a failure to attend to the varying conditions of sun and cloud.

Good Plumbing a Paying Investment

If the average property owner will only take time to consider the question he cannot do other than admit that the plumbing outfit of the ordinary dwelling or flat is, after all, the most difficult to maintain in proper sanitary condition and repair. This will become all the more apparent if the person interested will but examine his pile of repair bills for cleaning out traps, installing new supply pipes, closets, basins and innumerable small parts so important to the successful operation of the plant.

Usually the tenant is blamed for such a state of affairs, although in many instances the real fault may be traced to defective installation and the employment of light materials, which are unfit to properly withstand the wear and tear caused by the elements. It has often been pointed out that the method of conveying water through a building is a simple problem, requiring no especial ability on the part of the mechanic, while, on the other hand, the disposal of excrement without unnecessary odor or the violation of established plumbing regulations is an entirely different matter.

Providing the rough work has been installed in a proper manner, and heavy material is used, little trouble is likely to follow; but often an error is committed in finishing with seconds, or an inferior grade of materials, such as thin traps, pitted closets and basins or other weak or damaged parts. Under such circumstances there is but one sensible thing to do, and that is to rip them out and have the job done right and by an experienced plumber.

New Roofing Law

The San Francisco board of supervisors have amended their building laws regarding what material shall or shall not be used for roofing, and leaves it optional with the owner whether he uses asbestos sheets or other material. It is stated that the action of the board is a victory for the representatives of the Builders' Exchange and gravel roof men, who claimed that they were discriminated against.

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By the Way

Some Industrial Information Worth the While

Stop That Sewer Gas.

G. H. Brown has invented and placed upon the market a sanitary closet gasket that is said to be the only sanitary method of installing a water closet heretofore produced. It is made of the best vulcanized rubber, insuring an absolutely airtight connection with the sewer pipe. It is claimed the connection will resist leakage or escape of sewer gas for a lifetime. It does away with putty, plaster of paris and all similar substances which have been used in the past to insure sewer connections free from leakage. The Brown gasket also deadens the noise made in flushing closets and prevents staining of floors and all seepages. Offices have been established in the Sheldon building, and detailed information, including illustrated booklet, will be supplied upon application.

Butte Company Keeps Busy

The Butte Engineering and Electric Company of San Francisco has secured a contract for all the electrical work in the new Multnomah county courthouse at Portland, from plans by Architects Whidden & Lewis. The work includes electric wiring for lighting and telephones, electric time clocks, etc., and will amount to something over $12,000. The same firm is wiring a revolving steel bridge now under construction across the Sacramento river between Butte and Glenn counties. John B. Leonard is the engineer, and Cotton Bros. the contractors. There will be two large motors to revolve the bridge, in addition to safety appliances and automatic switches to make the revolving apparatus fool-proof.

New Architects

Certificates to practice architecture have been granted on examination by the Southern California Board to Frank Eager, of the firm of Eager & Eager, 701 Laughlin building, Los Angeles; De Forrest Howry, with the Home Builders, 410 Mason Opera House building, Los Angeles, and B. C. Baker, Pasadena.

WILSON BUILDING

W. L. SCHMOLLE, Architect

THIS cut shows the new Wilson Building, seven stories in height, which will be faced with the **Golden Gate Brick Co.'s buff clay pressed brick No. 15,** requiring 200,000. This building will be 30x130 ft., with an "L" 25x50, and will cost $104,000. It is located on Stockton Street at Campton place (between Post and Sutter) and will be used as a bachelor's hotel.

The **Golden Gate Brick Co.,** C. F. Pratt, manager, also sell **white enamel, mat glazed, fire brick** made of clay at **Stockton** and **"Golden Gate Sandstone"** brick made at **Antioch** as well as **Del Monte white (Monterey) sand, washed gravel, lime, flue lining, etc.** Finlayson-Stettin Company are the general contractors for this building.

GOLDEN GATE BRICK CO.
660 Market St., San Francisco

THE
Roebling Construction Co.
OF NEW YORK
FIREPROOF CONSTRUCTION
AND
WIRE LATH
THE SYSTEM THAT IS FIREPROOF
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Phone, Temporary 4312

Practical Show Window Device and Ventilation Control

After all these years a simple yet effective means for controlling show window ventilation has just been perfected. At some time or another every architect has been in search for an efficient means of taking care of this important point in the store front construction, and it remained for an architect to perfect a system as practical as it is efficient.

In 1905 a new type of store front construction was placed upon the market, the principle of which was to set glass in an all-metal ventilated sash, admitting a free circulation of air at all sides of glass and providing an excellent, yet inconspicuous system of drainage. At first it was thought impracticable, but the unusual growth in popularity, the unprecedented demand which was immediately created, has more than convinced the most skeptical that its introduction marked the first great advancement in store front construction to occur in many years.

This same inventor has now added a new device to the ventilation system, which gives the owner perfect control over this feature of the construction, an advantage of inestimable value to every merchant. During the warm summer days when no ventilation is needed—by simply moving an invisible slide in the metal sash all air is shut off, making an air-tight and dust-proof window. In the winter season when the temperature suddenly lowers or rises, the simple manipulation of this device regulates the ventilation of the show window perfectly, thereby preventing frost or sweat from forming on glass.

This improved ventilation and drainage sash (a part of the Kawneer System of Store Fronts), made by the Kawneer Manufacturing Company, Niles Mich., is recognized as the first great advancement made in store front construction since the introduction of the Kawneer system itself. The Kawneer principle, when thoroughly analyzed, will reveal many valuable construction features. Architecturally it is correct in all details. Method of grip on glass well deserves the careful consideration of the architect, inasmuch as this feature alone provides for expansion and contraction. The glass is held tightly at all times by a friction spring grip—forming a cushion during heavy wind pressure.

All parts are small, giving the unusual all-metal protection, yet creating the all-glass effect. Copper, brass, aluminum and bronze metals of first quality are employed in its manufacture, and as they can be highly burnished or finished in soft harmonizing effect, it is obvious that the Kawneer system of store fronts, the original all-metal construction, will merit a continuance of the favorable consideration of all architects.

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WEST OF CHICAGO
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IRON, STEEL, CEMENT
REPRESENTED AT
SEATTLE NEW YORK SAN DIEGO CHICAGO PUEBLO PHILADELPHIA BIRMINGHAM MONTREAL PITTSBURG GLASGOW

A High-Class Cement

Bickel's keene cement is finding an excellent field in San Francisco. It is being specified in place of real tile for bathrooms and kitchens, and architects find it gives splendid results when used as a wainscoting and for fancy and artistic finish of all kinds of interior work.

The discovery of a mountain of pure alabaster rock in the Wahsatch range has made it possible to manufacture a high-grade keene's cement in America, equal and in many respects superior to the imported article.

The manufacture of Bickel's keene cement involves the use of this high-class alabaster rock and scientific formulas and processes under the careful supervision of both European and American experts.

C. I. Chubbuch, of the Hydrate Lime and Plaster Company, speaking of the Bickel product, said:

"Keene's cement, when used for Scagliolia, is said to commend itself in preference to all other cements. There is no question but what it is cheaper and more satisfactory to use Scagliolia than any other material of equal hardness, and no other material is to be compared to it, either from the standpoint of artistic beauty or sanitation.

"It is to be regretted that this once popular art among the ancients should have lapsed into general disuse. Its limited use in recent times is owing principally to the manufacture having been restricted by parties who were guarding the trade secret. It is very encouraging, however, to modern architects and builders that information now at hand combined with a little practical experience and enterprise will enable the finishing of second or even third-class buildings at a very moderate cost."

The Duntley Pneumatic Cleaner.

This wonderful vacuum machine sweeps and dusts in one-quarter of the time of the old way, and does it ten times as effectively. It saves the wear on carpets, rugs, upholstery and curtains; it takes all of the dust and dirt out of each room every time you use it. It is the only method by which a room can be kept perfectly clean—walls, ceiling, woodwork, furniture, floor and all.

The Duntley Pneumatic Cleaner was awarded grand prize at the Seattle exposition, gold medal at the Golden West exhibitions in London, and has been approved by the Underwriters' National Electric Association.

It is declared by every impartial investigator to be the best machine of its kind yet built.

The Duntley cleaner removes the dust and dirt which lies underneath rugs and carpets as well as what is on the surface, and adds to their life by lifting and straightening the nap.

The San Francisco Compressed Air Cleaning Company, southeast corner Sutter and Stockton streets, San Francisco, are sole agents for the Duntley cleaner, and demonstrations are given at the above address for the benefit of those interested.

Time is Money With Progressive Contractors

Concrete contractors in this vicinity should realize that it is, in most cases, lack of up-to-date equipment that prevents their taking jobs at a profit during this era of low prices; they should realize that "time is money" and that the way to save money is to cut down the amount of labor in mixing and placing concrete. Improved new model concrete machinery will do this in two ways:

First, by cutting down the number of men required through substitution of mechanical for manual labor.

Second, by getting more results from the men due to time-saving devices. The mixer is the vital spot in concrete equipment, for it limits absolutely the output and therefore controls your labor cost, for you must have enough men to load and take away the batches, and practically the same size gang is required to handle a batch once in two minutes that could handle a batch every minute if the right equipment were installed.

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LANGE & BERGSTROM

BUILDING CONTRACTORS

ESTABLISHED 1900

1017 MONADNOCK BUILDING SAN FRANCISCO

The Lilley & Thurston Co., of 82 Second street, San Francisco, who are agents for the Wallace mixer, claim that right here is the point contractors do not comprehend; that the old-style mixers cannot turn out the batches often enough. They claim the time consumed in mixing and discharging is now reduced to a minimum in their non-tilting cylindrical drum mixers of the Wallace type, and that it is in the loading that time must be saved. They also claim that the excessive time spent in loading is wasted where barrows are dumped directly into the mixer, this waste time is larger than the time spent in mixing and discharging.

"Ceresit" Waterproofing Paste

The product known as "Ceresit," a waterproofing paste invented in Germany and patented in all the principal countries of the world, has already met with a large sale in the United States, and the manufacturers state that the demand is increasing at a gratifying rate. "Ceresit" is a paste easily dissolved in water, and this water is used in tempering the cement. It is capable of withstanding a very high water pressure and is simple in its application. The manufacturers state that their product is used exclusively by the German government in its building operations, where concrete or cement mortar is employed and that during the past year it was the only waterproofing to receive gold medals in the exhibitions at Wiesbaden and Leipzig, Germany. Those interested in solving the waterproofing problem should write for booklet "A" to the Ceresit Waterproofing Company, Commercial National Bank building, Chicago; or Parrott & Co., at any of their Pacific Coast branches.

White Bros.' New Stock List

White Bros., hardwood lumber dealers, with characteristic enterprise, have gotten out their new stock list this year in the form of a booklet, showing in addition to the usual tables, a number of half-tone cuts of the company's new yards, also views of the old plant and a picture or two of the Petaluma sawmill. Views are also shown of the teak and other hardwood logs piled up in the yards ready for the planers. The book is prefaced with a short history of the company, which is the story of the wonderful growth of the hardwood lumber business on the Pacific Coast. The firm of White Bros. was established in 1874, and today it claims to carry the largest stock of hard woods west of Chicago. The book will be mailed free on application.

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Reports and Estimates on Properties and Processes

Concrete Mixing

CONCRETE mixing is simple, but the necessary requirements are imperative if the best results are to be obtained. Perfect mixing means that every grain of sand must be coated with cement, and the cement coated with grains of sand must in turn thoroughly and completely fill the voids in the heavier aggregates. Every void not filled in this manner means a flaw—a weak spot in the concrete.

The workers of concrete have two ends in view: To cheapen the cost of concrete construction and increase its reliability. The item of labor in handling the material has been attacked and has offered the least resistance in the reduction of costs. The solution has been mainly along the lines of perfected mechanical equipment with increased capacity of ont-output. The present discussion has to do with the development of mechanical mixers. The field is full of many types, but the Clover Leaf, the one with the involute curved drum, is receiving attention where exacting conditions are imposed upon concrete work.

The peculiar and unusual shape of the drum is the secret of the success of the Clover Leaf mixer. To explain the action of this peculiar drum attention is called to the little illustration at the beginning of the article. There it will be noticed that the drum is revolving from right to left. As the material is carried along it falls of its own weight when it reaches a certain point. In falling the material is doubled over three times during each revolution. Each involute curve of the mixer in its turn, as the drum revolves, applies a positive mixing and kneading action to the mass.

A part of the mass falls and is doubled over from the upper involute curve while the balance falls and is doubled over from the section of the curve just below. By this motion all of the material is mixed three times each revolution. This does not mean a shifting of materials but an adequate mixing of the entire mass dur ing each revolution of the drum.

The involute curves overcome the tendency of the aggregate to gravitate to and accumulate in the bottom of the mixer. The turning over and doubling up is done as effectively as with the shovel.

The principle of mixing works equally well with dry, medium dry or sloppy mixtures. The involute curve must bring up, cut through and double over the material, whatever its consistency.

(Continued on Page 115.)

MECHANICAL

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Modern Automatic Dust Removing Appliances for Hotels, Office Buildings, Apartment Houses, Stores, Schools, Etc.

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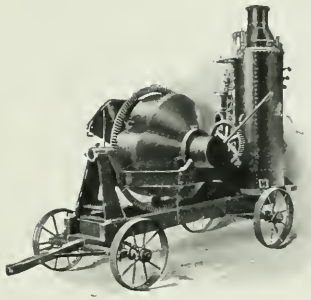

(Continued from page 113.)

The conical shape of the drum produces a uniform and regular lateral movement of the mass from end to end.

Scoops and deflectors are conspicuous by their absence. This means the absence of inert mixtures and a self-cleansing interior.

These mixers are made in sizes to handle 5, 7, 10 and 15 cubic feet at one batch. They are manufactured by the Clover Leaf Machine Company, South Bend, Indiana. The company is represented in the greater northwest by H. N. Rinker, 321 Pacific block, Seattle, and in San Francisco and vicinity by Boyd & Moore, San Francisco.

A Good Cement Plaster Job

Many favorable comments have been made by architects and others who have visited the new Stockton hotel, regarding the ornamental plaster and stucco work on the building. A. Knowles, of 985 Folsom street, San Francisco, was the contractor, and he spared no pains to make the job a satisfactory one. The hotel is Mission style, which afforded splendid opportunity for the plasterer to spread himself. The entire exterior is given a pleasing treatment of plain cement finish, while the interior has quite a little ornamental plaster and stucco work. An excellent cut of the hotel is shown in Mr. Knowles' advertisement in this issue.

An Invitation to Architects and Builders

White Brothers, the poineer hardwood lumber dealers of San Francisco, have just finished moving the largest stock of hardwoods west of Chicago from Spear and Howard streets, where they have conducted business for the past twenty-three years, to their new home at Fifth and Brannan streets. An invitation is extended to all architects, builders and any one interested in hardwood lumber, veneered panels, flooring and kindred lines, to visit their new location. The yards and offices have been very carefully planned, and the completed structures form a plant that has been pronounced by competent lumbermen to be one of the finest in the country. The broad gangways connecting one with another and allowing teams to drive in and out with practically the same freedom as on the city streets, reduces the cost of handling the lumber to a minimum. Their stock is practically new, as in moving from the old location White Brothers endeavored, and were very successful, in selling most of the old stock at slight reductions.

BROWN'S GASKET

A New Sanitary Plumbing Device to Prevent the Escape of Water and Sewer Gas

DEADENS NOISE OF FLUSHING

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Order from Your Jobber

Terra Cotta Men Up in Arms

The new plumbing ordinance in Berkeley is not very popular with some of the contractors and builders. The main objection to it is that all buildings erected in the future must have cast-iron sewer piping in place of terra cotta sewer pipe formerly used. The price of terra cotta pipe in Berkeley has been 12½ cents a foot, while the cost of cast-iron pipe is 40 cents a foot. Contractors generally are of the opinion that terra cotta pipe has always done the work required of it in a satisfactory manner, and do not believe that the added expense of the cast-iron pipes will be justified by the results. A concerted effort is to be made to have the ordinance repealed.

W BRAND M

WORDEN-MEEKER VARNISH CO.

Products of Uniform Quality

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"CROSS" COUNTER-BALANCE FREIGHT ELEVATOR DOORS
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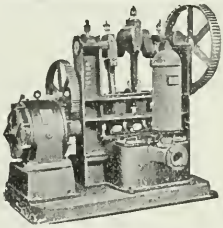

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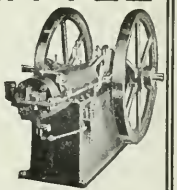

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MANAGER OF BUILDING OPERATIONS.

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First Move to Make San Francisco an "Open Shop" Town

San Francisco contractors have begun a movement for the "open shop," and a bitter fight between the union and non-union forces would seem to be near at hand.

The contractors in the various construction and material industries have organized the Affiliated Contractors' Association of San Francisco, the following organizations being represented: San Francisco Lumbermen's Club, Master Painters' and Decorators' Association, Contracting Plasterers' Association, Concrete Contractors' Association, Association of General Building Contractors, San Francisco Retail Hardware Dealers' Association, Masons' and Builders' Association, California Metal Trades' Association, Contracting Lathers' Association, Cement, Lime and Plaster Credit Association, Structural Steel and Ornamental Iron Branch, Roofing Contractors' Association. The officers are: President, A. H. Bergstrom; vice-president, F. H. Masow; secretary, W. S. Scott; treasurer, A. B. Johnson; assistant secretary, G. H. McCallum.

Charles A. Day, chairman of the press committee, said in an interview: "This association was organized for the purpose of promoting harmony and dealing with all disputes and differences with labor unions, and for the promotion of the welfare of the building industries."

Undesirable Contractors

[From the Improvement Bulletin.]

In San Francisco, steps are being taken to get rid of unreliable contractors, who have been rather conspicuous since the rush of rebuilding after the fire, let in many who would have otherwise found it hard sledding to get work. Architects are urged to exclude them from figuring their work, but often find it hard to do. Owners are sometimes suspicious, and when an architect seeks to exclude a low bidder because of unreliability, they sometimes insist upon considering them, apparently expecting the architect to see to it that the contractors whom he regards as unsatisfactory, shall be compelled to do satisfactory work. No owner would attempt to handle such a task himself. The effort to force a suspected and doubtful workman to perform work which it is doubtful if he could and would, is more than most of us would be willing to undertake.

Santa Fe to Build at San Diego

Plans for a new passenger depot, 350 by 50 feet, and two big freight sheds to be built of reinforced concrete and to cost approximately $500,000, have been made by officials of the Santa Fe system for the city of San Diego. The new depot will occupy the site of the present passenger depot and freight shed, and the two new freight sheds will be located two blocks south of the passenger depot.

Pioneer Roofing Paper

The Pioneer Roofing Company, of Los Angeles, reports a number of large roofing contracts under way in which Pioneer Specification roofing is being used, notably the manual training buildings, a group of five structures, located on Vermont avenue, between Forty-second and Forty-third streets, Los Angeles, and for which Parkinson & Bergstrom are the architects. Pioneer Specification roofing is also being laid on the high school buildings at Hollywood, 100,000 square feet being required on the manual training buildings, and 40,000 for the Union high school structure. The company has issued several up-to-date roofing booklets, which will be sent on request, together with samples.

Two Pretentious Apartment Houses

Architect L. M. Gardner, of San Francisco, has recently prepared plans and construction work has been started on two attractive apartment houses. One is for Dr. John A. Miller, and is being erected at Bush and Stockton streets, at a cost of $60,000; while the other is for Dr. J. Soboslay, and is on Stockton, near Sutter street. Both buildings are to be six stories and basement, and will have all modern conveniences.

Los Angeles Building Record

The record of building permits issued by the Los Angeles department of buildings for the first half of the year totals more than $11,000,000. The report of the department for the fiscal year from July 1, 1909, to June 30, 1910, shows over 10,000 permits issued by the department, representing structures started during these twelve months valued at over $19,000,000.

Reference Books on Building

The Brooklyn public library has just published a catalogue of books on building and building trades which are in the Brooklyn library. For those desiring a complete reference list of books dealing with building construction, the catalogue should be most valuable. The book will be mailed free on application.

THE IMPORTANCE OF VARNISHES AND STAINS

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Home of Selby White Lead.

ARCHITECTS and others who specify or use Selby white lead, manufactured by the National Lead Company of California, executive offices, Merchants' Exchange building, San Francisco, doubtless will be interested in the following brief sketch of the Selby works, located one mile from Vallejo Junction, and twenty-nine miles from San Francisco: Founded in 1868 by Thomas Selby, a pioneer hardware merchant of San Francisco, the business has expanded until today the plant has a refining capacity of $25,000,000 worth of gold and 12,000,000 to 15,000,000 ounces of silver per annum.

In 1864 Selby built a shot-tower on the corner of First and Howard streets, San Francisco, where it stood until the earthquake and fire. He imported his lead from Spain and England; and finding this both awkward and costly, he conceived the idea of treating the lead ores yielded by the mines of the Pacific Coast, and started to make his own lead in 1868. After his death, in 1875, the business was incorporated, A. J. Ralston becoming president, and H. B. Underhill, Jr., secretary, of the Selby Smelting and Lead Company. In 1905 the control was sold to the American Smelters Securities Corporation, and Mr. Underhill became president.

The smelter gets a variety of products from different localities, but its chief supply consists of the argentiferous lead ore from Idaho and the silicious gold-silver ores of Nevada. The Bunker Hill & Sullivan mine sends crude ore, "bull-jig" concentrate, fine concentrate, and slime.

The plant is run by electricity, there being a separate motor for each part of the process. The current is supplied by the Bay Counties Power Company, from a generating station at Colgate, in Yuba county, 140 miles distant. The transmission of power involves crossing the Straits of Carquinez, a short distance above Selby, where the estuary of the Sacramento is 2,750 feet wide. Two towers carry the line; that on the north side of the straits is 225 feet high on a bluff 160 feet above the water, and the one on the south side near Crockett, is 64 feet high, at an altitude of 300 feet. The span, from tower to tower, is 4,427 feet long.

The smelting operations are under the direction of E. N. Engelhardt, as manager, with F. C. Newton, as assistant. The superintendent of the white lead plant is J. P. Neville. Thus a Russian, an American and an Englishman unite in manufacturing the pigment, and just as the various substances required in the making of white lead come from localities widely separated, so the intelligence that applies them usefully is contributed by diverse nationalities.

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Some Features of the Holmes Disappearing Bed.

One-third of the time of the human race is spent in bed. Great care, time and money are expended upon the equipment of the bed chamber. The beds require a care which forms a large share of the burden of the household; besides each bed usually occupies the most valuable part of the room.

The Holmes disappearing bed takes no valuable space, necessitates very little care, and can very easily be handled by a child. A strong, durable enamel iron or brass bed, always remaining in a natural horizontal position, being so simple in construction that it is impossible to get out of order. It can instantly be placed in any part of the room and without the slightest effort or inconvenience rolled back into its galvanized iron recess entirely out of the room.

A contractor, after inspecting the bed, said: "It is the only thing in the way of a modern improvement for a house I have ever seen which does not add additional expense, for the reason that you can make your house or rooms smaller than you originally intended, and with the installation of the disappearing beds you have more room.

Opens Portland Office

The Holmes Disappearing Bed Company has recently opened an office and display rooms in Portland, Ore. The announcement of the opening is a very neat folder containing some "bed facts" and half-tone illustrations showing the interiors of the sample rooms. It is claimed that this suite of display rooms is the finest that the company has yet attempted. S. B. Cooke is the manager in charge, at 422-3-4 Failing building.

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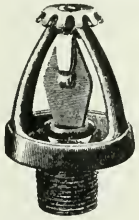

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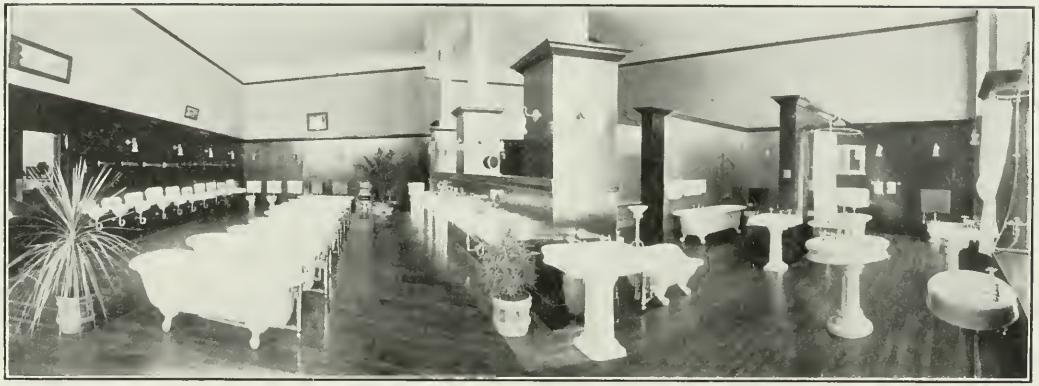


Attractive Display Rooms of Haines, Jones & Cadbury, San Francisco, Cal.

Attractive Display Rooms of Well-Known Plumbing House

The accompanying illustration shows the new display and sales department of Haines, Jones & Cadbury, the well-known dealers in plumbing supplies. The cut is made from a photograph taken soon after the company moved to its new quarters on Folsom street, between Fourth and Fifth streets, and within three blocks of the business center of San Francisco. The location is much more accessible than the old quarters, which were put up as a temporary accommodation immediately after the earthquake and fire. Plenty of light contributes to the attractiveness of the new show rooms. A number of bathrooms have been fitted up with complete fixture equipment, including closets, baths, set bowls, etc., and these have the water attachments so that the architect and prospective buyer may not only see the fixtures in place, but in operation. The floor of the show room is oak, and the windows are plate glass. Each bathroom has a different finish to harmonize with the fixtures. One room is finished in glazed tile, another in white enamel; still another is worked out in white cedar, while a fourth is in native redwood. Several shower attachments also are shown. Contrary to the general impression, the shower may be used in most any bathroom without special construction or expense. A drinking fountain is also displayed. This is a device for drinking without the use of cups, and commends itself from a sanitary point as particularly useful in schools and buildings where many persons would be likely to drink from the same cup. With fresh water running through it continually, the fountain is always clean, and the absence of cups effectually disposes of any possibility of disease contraction.

New Blackstone Hotel Chicago, Ill.

Marshall & Fox, Architects

This Building Waterproofed with Te-Pe-Co

Te-Pe-Co, a Waterproof Paint

EVERY architect, builder and contractor should become thoroughly conversant with the merits of Te-pe-co. It is generally admitted that all structures of brick, cement, concrete, or sandstone, should be protected against the elements. If waterproofed with Te-pe-co the surface will remain new indefinitely.

Bridges or acqueducts and concrete pipe should be waterproofed with Te-pe-co. The material is colorless, and will absolutely prevent efflorescence as well as water stains. It is better and more economical than any waterproofing in existence. It can be applied with brush or spray pump, and it waterproofs for all time.

It is the natural tendency of concrete, brick and porous stone to absorb water. It is because these materials contain millions of pores, thirsty mouths fairly clamoring for drink. The water seeps its way into these pores and in every storm of duration the building becomes so thoroughly soaked that its color tone is changed from light to dark, and presently a clammy, chilly dampness pervades the entire walls, a positive discomfort and menace to health.

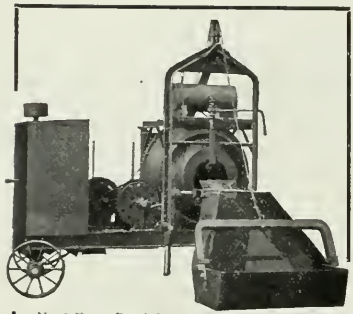
Te-pe-co absolutely keeps moisture out of the pores of concrete, brick or porous stone, and instead of pasting a film over the mouths of these pores, it permanently seals them up. It is not a surface coating to be washed away by rain or made to disintegrate by exposure to heat, cold and storm.

Architects and builders who have practically tested the material recognize that the keynote has been struck, and absolutely insist upon Te-pe-co being used.

It has replaced all grease and paraffine mixtures that have been used. The sanitary value of Te-pe-co cannot be overestimated. It is the fundamental principle of hygiene that a dry habitation is imperative would we enjoy a normal degree of health.

Many mixtures and compounds give temporary benefit, but none offer any assurance of permanency, nor can they give a guarantee as Te-pe-co does.

There is no attraction between oil and concrete. The oil evaporates, leaving the pores open for water to seep into, and it is impossible to change this or the unstable quality of oil. Its efficiency as an



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important agent in a waterproofing mixture is of no value whatever in building construction where permanency is the all-vital point.

Te-pe-co is a mineral liquid compound, absolutely free from oil—a permanent waterproofing solution. As a successful waterproofing for concrete block structures, monolithic concrete, sand lime brick (common or pressed), sandstone, limestone, Bedford and porous stone, Te-pe-co in its individuality stands alone. There is nothing else like it.

It is unequaled for damp-proofing the exterior and interior walls of brick or concrete structures or houses before plastering. Used in this manner for the interior it saves the cost of furring, as plaster may be applied direct to the wall. Te-pe-co has no superior as a primer on plastered walls before painting, calcimining or enameling. For railroad and general bridge construction, engineers have found its practical value. It will successfully waterproof marbelite—no other known compound will.

It will absolutely prevent efflorescence, making impossible those disfiguring patches of whitish blue marring the exterior of a building. This efflorescence is caused by moisture mixing with the sulphates, carbonates, salts and acids in the combination with the aggregates of concrete and brick construction.

As the walls of a rain-soaked building dry out these chemical compounds find their way to the surface, disfiguring it with a musty scum. Te-pe-co prevents this. It is not affected by heat or cold. It prevents cement floors from dusting, and prevents penetration of water under heavy pressure, as in dams, bridges, and so forth.

One of the departments of the United States government made a series of tests of Te-pe-co, using a number of 4-foot concrete pipes, having a 12-inch inside and 18-inch outside diameter. A 1-2-4 mixture was employed, no reinforcing being used. The pipes were subjected to pressure ranging from 30 to 70 pounds to the square inch, and the various tests indicated that constant pressure increased the efficiency of the waterproofing.

Many are misled by the cheapness of so-called waterproofing compounds—paints that won't stick and that prevent the proper bonding of cement and concrete, and so detract from the strength and durability of the structure.

The Bass Hueter Paint Company of San Francisco are the Pacific Coast agents for the manufacturers of Te-pe-co, and the material is carried in large quantities at San Francisco and their various branches—Portland, Seattle and Los Angeles.

San Diego's Suspension Bridge

The city of San Diego may, in the not distant future, be able to boast a suspension bridge. The city engineer, E. M. Capps, is reported to have completed the design of a steel suspension foot bridge to span a deep canyon on Spruce street between Front and Brant. It will be a unique structure, resembling in construction the old Brooklyn bridge.

It will be the longest and only bridge of its kind in this section of the State. The total length, according to the plans, will be 450 feet. It will be supported by two 1⅝-inch chilled steel cables, suspended from two steel towers, and anchored on each side of the canyon in a mass of solid concrete, imbedded in hardpan.

The span from tower to tower will be 300 feet in length, with the approach at each end about 75 feet, making the total length of the bridge 450 feet. The height of the towers will be approximately 35 feet over all, 25 feet above the floor of the bridge and 10 feet below.

Annual Convention of Electrical Contractors

The California State Electrical Contractors' Association held its annual convention in San Francisco, July 5-8.

This association, while only eight months old, is already strong, both financially and in membership, having $1,500 in its treasury, and a roll of 160 members. It was organized to bring order out of chaos in the electrical contracting business, and one of the results accomplished has been a better definition of the different branches of the business; the wholesale and jobbing business is now on a basis, for instance, where it does not interfere with the retail and contracting end.

The work of the association is largely along educational lines. At the convention last week, the supply end was the chief topic of discussion, the channels of trade, supply situation and the trade situation in general. Papers were read also bearing on various phases of electrical contracting. It was a successful session. The convention in Los Angeles next year is expected to bring an attendance of about 100 members, with their families.

The following are the officers elected for the coming year: W. S. Hanbridge, San Francisco, president; H. B. Woodill, Los Angeles, first vice-president; Carl Heilbron, San Diego, second vice-president; F. E. Meyers, San Francisco, secretary and treasurer.

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THE ARCHITECT AND ENGINEER OF CALIFORNIA

PACIFIC COAST STATES

SEPTEMBER, 1910

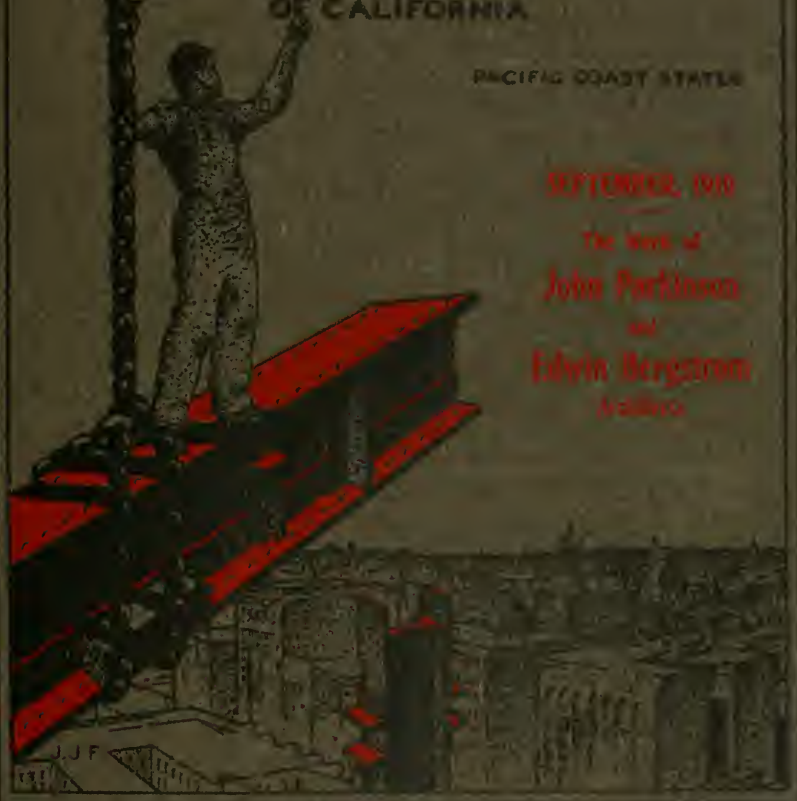
The Work of

John Parkinson

and

Edwin Bergstrom

Architects



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SAN FRANCISCO SACRAMENTO LOS ANGELES

The Architect and Engineer
of California
Pacific Coast States

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Issued monthly in the interests of Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast.

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JOHN PARKINSON

Architect

EDWIN
BERGSTROM

Architect

Frontispiece
Architect and Engineer of
California
September, 1910

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THE

Architect and Engineer

Of California

Pacific Coast States

VOL. XXII. SEPTEMBER, 1910. No. 2.

Hotel Maryland, Pasadena, Cal.
John Parkinson, Architect

The Work of John Parkinson and Edwin Bergstrom

FEW Pacific Coast architects have enjoyed more signal success in the practice of their profession than have Messrs. John Parkinson and Edwin Bergstrom of Los Angeles. In the comparatively few years that the two have been associated together, they have been called upon to design and superintend buildings whose aggregate cost runs into many millions. The illustrations of their work in this number tell the story of their success more forcibly than words. The great majority of the buildings shown are in Southern California, where both members of the firm have made their home since the partnership began. Their success in Southern California, naturally enough, has attracted outside attention, and at the present time two splendid structures, involving an expenditure of close to $2,000,000, are under construction in Salt Lake City—both buildings having been designed by Messrs. Parkinson and Bergstrom.

Specializing in high class commercial work, Messrs. Parkinson and Bergstrom are recognized as an authority in this class of building construction, and their services are being sought by capitalists and bankers all over the Coast.

Union Trust Building, Los Angeles
Parkinson & Bergstrom, Architects

Detail of Union Trust Building, and Street Scene, Showing Angelus Hotel and Trust Building

Detail of Entrance, Angelus Hotel

It is no exaggeration to say that this firm has undoubtedly designed more class A buildings than any other architect in the West. They have shown a decided preference for the steel frame with brick walls and terra cotta ornamentation. Concrete has been used sparingly for structural framing.

Among the more important structures designed and completed by Messrs. Parkinson and Bergstrom are the Pacific Mutual Life Insurance building, a classic conception with imposing columns extending the full height of the building; the Security building, the Alexandria hotel, the Grant building, O. T. Johnson building, Laughlin building, California club, Angelus hotel, Union Trust building, Los Angeles Trust building, Norton building, Bullock's department store, Central building, all in Los Angeles; the Chamber of Commerce building and Hotel Maryland, Pasadena; Hotel Southland, Dallas, Texas; Taft & Pennoyer department store, Oakland, Cal., and numerous other structures of less importance.

Interior Angelus Hotel, Los Angeles

Mantel in Lounging Room, Angelus Hotel

Security Savings Bank Building, Los Angeles
Parkinson & Bergstrom, Architects

Buildings under construction at the present time represent an ultimate expenditure of more than six millions of dollars, and include the Hotel Utah, Salt Lake City, Utah; Kearns' building, a ten-story office building, Salt Lake City; an eleven-story office and bank building for the Los Angeles Trust & Savings Bank, Los Angeles; an addition to the Alexandria hotel; Chester building, a twelve-story office building; Los Angeles Athletic Club, a twelve-story building; office building for the Water Board of Los Angeles; Manual Training high school, Los Angeles, and an office and bank building for the First National Bank of Riverside, Cal.

The success of Messrs. Parkinson and Bergstrom is attributed largely to the frank expression of their buildings for the purpose, the practical arrangement in plan and the sound business care with which their work has been conducted. The Security building in Los Angeles is a good example of their work. The exterior treatment is of light color terra cotta, and the building demonstrates what can be attained by the use of good proportions throughout the entire mass.

Mr. John Parkinson, the senior member of the firm, was born in Bolton, England, December 12, 1861. He was educated in England and

Entrance to Safe Deposit Department, Security Savings Bank Building

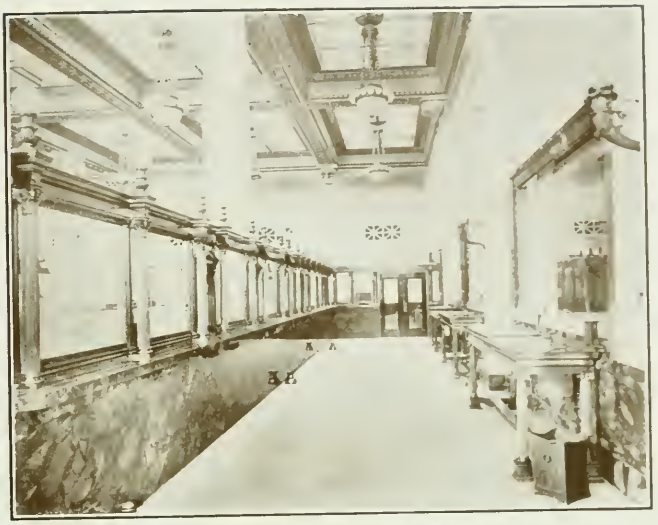
Elevator Hall, Security Savings Bank Building

Detail of Entrance, Security Savings Bank

Interior, Security Savings Bank

Interior, Security Savings Bank

Detail of Vaults, Security Savings Bank



Interior, Security Savings Bank

took the architectural and engineering course in the Mechanics Institute at Bolton. He came to the United States in 1883 and after spending two years in Minneapolis, journeyed to the Pacific coast, making his residence at Napa, Northern California. Three and one-half years later Mr. Parkinson removed to Seattle, Wash., where he practiced his profession for five years, designing a number of prominent business and school buildings, the best of which was the Pacific building. In 1894 Mr. Parkinson located in Los Angeles, where he has since resided. He is a member of the California, the Jonathan and the Los Angeles Athletic clubs; the Engineers' and Architects' Association of Los Angeles, the Los Angeles Architectural Club, the Automobile Club of Southern California, the Los Angeles Chamber of Commerce and the Municipal League. He is also an active member of Los Angeles Chapter, American Institute of Architects, besides being an associate member of the American Institute of Architects, Washington, D. C.

In 1905 Mr. Edwin Bergstrom became associated with Mr. Parkinson under the firm name of Parkinson and Bergstrom. Mr. Bergstrom is a native of Wisconsin and is 34 years of age. He is a graduate of the Boston Institute of Technology and Sheffield Scientific School at Yale College, New Haven, Conn. He is a member of the California, Jonathan, Athletic and University Clubs of Los Angeles, the New England College Club, the Engineers' and Architects' Association; the Yale Alumni Association Club, the Southern California Chapter of the American Institute of Architects, the Automobile Club of Southern California, the American Auto Association, the Yale Club of New York, the University and Alta Clubs of Salt Lake City, the Municipal League and the Los Angeles Chamber of Commerce.

Central Building, Los Angeles
Parkinson & Bergstrom, Architects

Pacific Mutual Life Insurance Building, Los [illegible]
Parkinson & Bergstrom, Architects

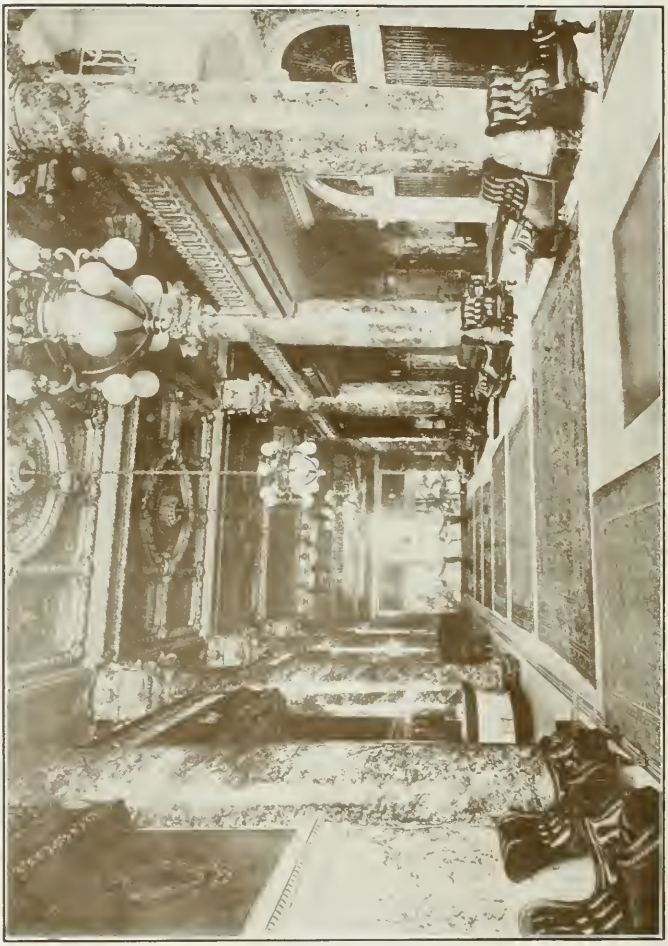
Detail of Pacific Mutual Life Insurance Building, Los Angeles
Parkinson & Bergstrom, Architects

Security Building and Hotel [illegible] Los Angeles
Parkinson & Berg[illegible]

Hotel Alexandria, Los Angeles
Parkinson & Bergstrom, Architects

Dining Room, Hotel Alexandria, Los Angeles

Grill Room, Hotel Alexandria, Los Angeles



Lobby, Hotel Alexandria, Los Angeles

Parkinson & Bergstrom, Architects

Los Angeles Trust Building
John Parkinson, Architect

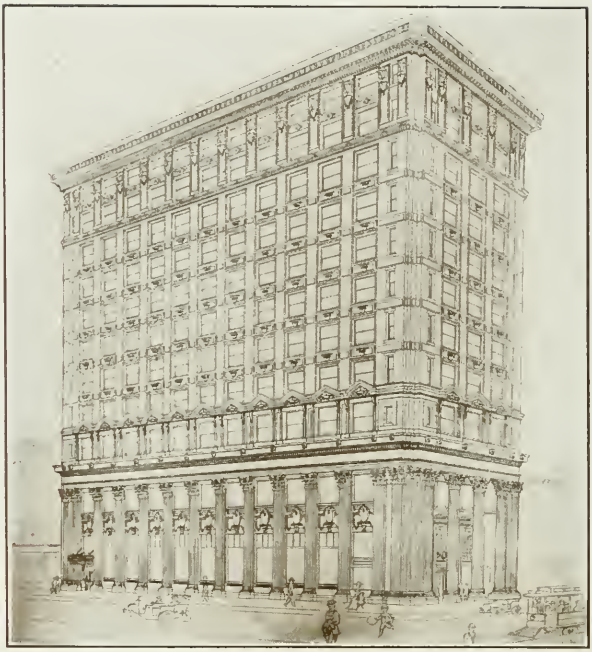
Bullock Department Store Building, Los Angeles
Parkinson & Bergstrom, Architects

H. Jevne Building, Los Angeles
Parkinson & Bergstrom, Architects

Bresee Bros.' Undertaking Building, Los Angeles
Parkinson & Bergstrom, Architects

Interior, Bresee Bros.' Building

Chapel, Bresee Bros.' Building



Los Angeles Trust & Savings Bank Building, from Architect's Drawing
Interior Finish by the Hughes Manufacturing & Lumber Company
Parkinson & Bergstrom, Architects

Youman's Building, Los Angeles

Hotel Yorkshire, Los Angeles *Parkinson & Bergstrom, Architects*

Taft & Pennoyer Building, Oakland *Parkinson & Bergstrom, Architects*

Detail of Entrance to Taft & Pennoyer Building, Oakland

Grant Building, Los Angeles
Parkinson & Bergstrom, Architects

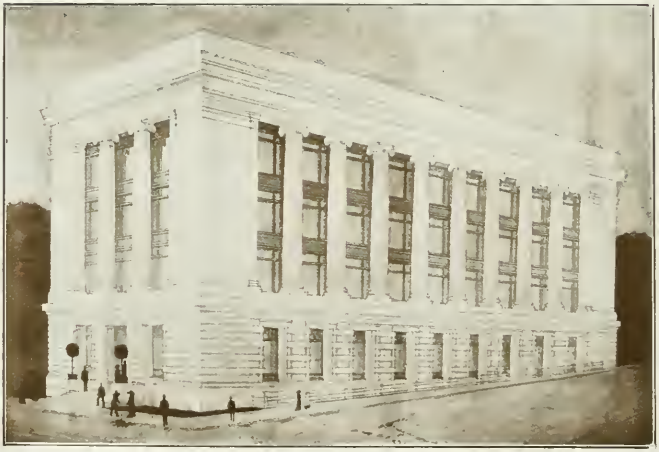
Mason Opera House, Los Angeles *Parkinson & Bergstrom, Architects*

Jacoby, Lane & Laughlin Buildings. The Latter was the First Class A Office Building in Los Angeles, Built in 1896. *John Parkinson, Architect*

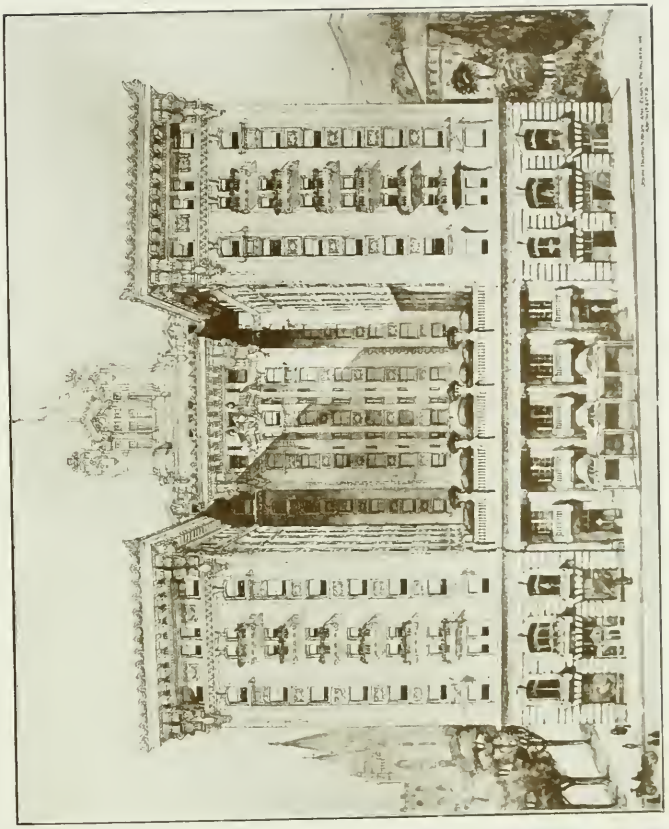
California Club Building, Los Angeles
Parkinson & Bergstrom, Architects

Chamber of Commerce Building, Pasadena
Parkinson & Bergstrom, Architects

Front Elevation (Architect's Drawing), Chester Building, Los Angeles



Building for Los Angeles Water Board, from the Architect's Drawing
Parkinson & Bergstrom, Architects



Hotel Utah, Salt Lake City, now under Construction. From the Architect's Drawing
Parkinson & Bergstrom, Architects

First National Bank Building, Monrovia, Cal.
Parkinson & Bergstrom, Architects

Interior, First National Bank Building, Monrovia, Cal.

Edison Electric Building, Los Angeles

King Edward Hotel, Los Angeles
Parkinson & Bergstrom, Architects

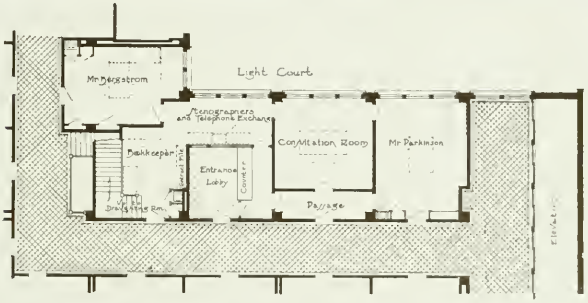
Currier Building, Los Angeles. One of the First Office Buildings Designed by Mr. Parkinson

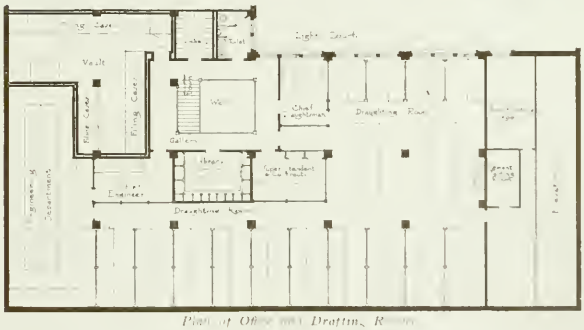
Residence of Colonel Sterns, Los Angeles — *Parkinson & Bergstrom, Architects*

Residence of Mr. John Parkinson, Los Angeles

Residence of Mr. Edwin Bergstrom, Los Angeles

Drafting Force of Messrs. Parkinson & Bergstrom





Plan of Office and Drafting Room

Enameled Brick

ENAMELED bricks are meeting with increased favor in this country, as a material of utility and beauty for buildings and other purposes, and many fields in which they can be used are constantly presenting themselves. Formerly a prejudice existed to the use of enameled brick, owing to the fact that they had to be imported from abroad. Of recent years several of the leading brick manufacturers have made enameled brick in this country. Some of them have been singularly successful. Enameled brick manufactured by one firm is similar to that made in England. They place the enamel on a fire-brick body and burn with one firing. Some manufacturers endeavor to produce enameled brick by using previously burned brick, dipping it in a glaze and again firing it. The effect is to produce an uneven finish. By the English process the enameled surface is perfect in every respect. Enameled brick have won such favor in England that the municipality of London requires that all courts and alleys be built of the material.

Enameled brick is largely used abroad, and foreigners express surprise that our architects do not utilize them more extensively, as they reflect light, are fire-proof, have no odor, prevent dampness and have a fine finished surface which is ornamental.—Clayworker.

*
* *

Ruminations and Cogitations

By F. W. FITZPATRICK.

GLORY be! and again Hallelujah! It is here, right with us, in our midst, in its incipiency, true, but here nevertheless. And direct from dear Paree. Think of what we owe the French, anyway; help in the dark days of our revolt against the oppression of Gawge, the latest gowns, the training of our youths in the proper way of wearing their little nighties while designing beautiful projets and nonchalantly smoking cigarettes. Why, words fail me in my emotion while even thinking of what we've had that bore the magic trade-mark—"Made in France." There is Beaux-Artism and Classicism, both from there. We still have the latter so badly that even our dog-kennels and bird-houses, let alone our railway stations and mansions, are adaptations from the Baths of Thingaclees or the circus of some one else at Rome or Athens and handed to us via Paris. From there came, too, the "Idealism" that rattled so many of us, and then "Impressionism," the dainty dabbler. In the wake of the latter came the more robust "Materialism," soon followed by Nouveau Artism and now, most nouveau of all, "EXCESSIVISM." All hail, thou new Fad! Thrice welcome art thou. Anything to stir things up a bit; the crazier you are, the more fun you'll be.

It is here for I saw IT. Only the other day was I shown an architectural drawing that so informed me. It was by one of the real bong-tongs of the art of pictorial, it had a lurid purple sky, the trees were a brilliant pink carmine, the water a yellow so vivid you felt a bit jaundiced just looking at it, and the building, in life an ordinary, sober gray, was the most rakish, tipsy, Carien, Orientalesque ivory and gold you ever did see. I enthused properly and assuming an air of profound erudition referred to it as a splendid specimen of impressionistic work. "Impressionist nothing," unpoetically

said my friend who was showing it to me, "it is of that new ekole (bear down hard on the k) "Excessivist." And sure enough, so it was.

"Excessivism is a good name. Here is the manifesto lately launched by its progenitors; read it:

"Excess in all is force, the only force. The sun is never too ardent, the sky too green (?), the distant sea too red or obscurity too thickly black, as never are our heroes too audacious, flowers too odorous or maidens too beautiful."

Brighten the palettes, dip the brushes deeply and heighten the tones! All hail to the scarlets, the purples, the coruscating gems, all those tones that—that's enough. You see what we're going to get. Just now it is only the architectural pictures that are affected; later you'll get it in the buildings themselves; carnation walls, cerulean roofs. If a column two feet in diameter is normal, they'll make it six feet. We'll be getting seventy-two storied buildings in New York. If a little is a good thing, why, put in more of it, get it all on—Perhaps Wallace Irwin was in prophetic mood when he wrote, of Senator Clark's monstrosity of a house in New York—

Every style, from the Greeks to the Hindoos,
Dago front porches and Siamese windows,
Japanese cupolas fightin' with Russian,
Walls Senegambian, Turkish and Prussian;
Pillars Ionic,
Eaves Babylonic,
Doors cut in scallops, resemblin' a shell;
Roof wuz Egyptian,
Gables caniptian;
Whole grand effect, when completed, wuz—hell!

"Excessivism," that's the word. Don't go and forget it. It is now to laugh, la, la, but it will be most serious soon. Voyez?

* * *

HAVE just been reading the newspaper descriptions of the opening ceremonies of two great hotels. There was a stuffing feast, discourses, and toasts and all the proceedings duly chronicled, the beauties of the building extolled, a dainty tribute paid to the decorator, the furniture man was complimented, even the chefs mentioned, but through it all—toasts, newspapers, everything—not a blooming, blithering word about either architect, and both are some pumpkins, too! Such is fame.

Just to counterbalance that. Did you ever read of an architect in fiction? I don't mean in classic stuff, Dickens et al., but in contemporaneous fiction, the cheap truck we've been fed upon for the past few years? No, at least not until very recently. He was an unknown quantity. There were butcher heroes, hardware merchant heroes, engineers, boot blacks, just gentleman-heroes and all that, but never an architect. Now, then, in some late fiction I notice that an architect is a near hero; he is about third-fiddle in the plot, and in one of the "best sellers" just out, the hero himself is an architect, by gracious! Think of it, an architect hero! Coming into our own at last.

* * *

DO YOU ever boil over? In so many cities have I lately seen the thing that made me boil, the useless, the sacriligious destruction of trees. In one place an alleged "landscape architect" was destroying a glorious grove of old chestnuts, noble fellows, because there did he intend planting some low growing bushes! Cutting out the only really beautiful detail upon his employer's premises. In Washington they are preparing a new avenue, it runs through a fine old oak woods, splendid specimens of

a hundred years or more, and they were on the right grade and all but do you suppose they could be saved? No, it has been decreed that they must go, so in parking, inside the sidewalk, they are destroying as fine full-grown oaks, as you could wish to see and planting in their stead, measley little toothpick maple affairs that won't afford shade enough to cover a healthy sparrow for the next twenty years. But these seedlings are in a certain proper methodically-correct spacing, according to the Hoyle of street-autocrats. "Municipal intelligence," forsooth!

* * *

WHY are architects as a class so deucedly clammy, chilly, distant, exclusive, coy or dignified, or whatever else you wish to term what they are? It seems to be the general opinion that they are, anyway, and I've seen enough of it in them to believe that general opinion is right. Unless you take them in a job on a silver salver you are made to feel that persona non grata isn't in it with you. Contractors—barring a pet or two—material men, newspaper men, all such would just as soon go into an ice-house as into the average architect's office. And perhaps that accounts for the scant notice the brethren get from the newspapers and about which neglect they feel so aggrieved, so sore.

The other day I met the editor of a journal coming out of an office building. He is a fine fellow, a power in his field and can have and perhaps has twenty architects at his beck and call. Just as we met, some men carried out a coffin from an adjacent building to a waiting hearse. My friend stopped and with a pleased smile held out his hands toward the coffin much as a man would warm his hands before a fire. It was merely an "aside" unnoticed by others and for my benefit. I bit and asked what ailed him. "Great Heavens, Fitz," said he, shuddering as if chilled to the marrow, "I've just been in to see So-and-so, the Architect!" And I've seen that same So-and-so cringe and fawn and fall all over himself if he thought he saw a prospective client in a visitor.

Shake it up, gentlemen, come out of it. A smile, a cheerful word, a bit of warmth is a blessing to the recipient and was never known to hurt the giver. And while you're at it your example may influence the haughty minions you keep at your doors. I have yet to see the architect's office boy—like master, like man, I suppose—whom it would not be a real pleasure to put across one's knee and thoroughly spank with a fine large shingle, and I don't feel that way toward other office boys, amusing, impudent little devils mostly though they be, but the architect's kind—bah, insufferable cads! They are part of the "dignity" of that office, say you. Well, heaven help that dignity and that office. By the way, speaking of funerals and such, do you realize, gentlemen, that there's absolutely nothing so really dignified as a corpse, a dead—'um? Think it over.

* * *

THERE'S a movement afoot to establish and upon a large scale and firm base, trade schools. The architects should not only approve of them and talk about them in convention, but ought to get out and actively work for the consummation of that plan. Of all classes, perhaps, theirs suffer most for the lack of just such schools. Skilled craftsmen are all too few and the architects appreciate, if no one else does, how deucedly hard it is to get work properly done.

Right here in Washington, the nation's capital, it is a rather sad commentary upon our economic foresight and system that if a boy really wants to learn a trade the only school open to him is the reform school,

admission to which is via a commitment by a court for some punishable misdemeanor! True we have high falutin' "manual training" schools and all that, where boys of seventeen or thereabout—if their parents can keep them in school that long—study the chemistry of it all, and dally with expensive machinery and absorb a glossary of ohms and amperes et al., a foundation for an engineering course at college. But the real trades, making and laying of bricks, shoeing of horses, plastering of walls, digging a ditch, etc., etc., are taught only at the reform school. And a splendid school it is. Superintendent Darnall has out-Lindsayed Lindsay in his handling of those boys. He is making men of them, able and good and useful men. He has had the name changed to the "National Training School," has removed the bars and gates and other prison-like paraphernalia, the boys worship him and realize that they are there for their own good and actually beg to remain after their terms of "confinement" are up in order to keep on in the trade, the schooling, the training they have begun. More's the pity that admission to that real school necessitates the commission of a juvenile crime! A travesty upon our alleged civilization, indeed.

* * *

Magnesite Not a Dependable Product for Interior Wall Finish

To the Editor of the Architect and Engineer:

Is the compound, "Magnesite," on metal lath, for exterior wall finish, superior to the cement and sand finish? I have a large Mission style church to finish, and some parties claim that Magnesite has been used in California for a long time and, in fact, is displacing cement, plaster, etc., but I cannot find it advertised and do not know who makes it. Now, if it really is superior, would you kindly give me the manufacturers' address? Thanking you in advance for the favor asked, I am, yours truly,

F. M. STARRETT,
Forest Grove, Ore.

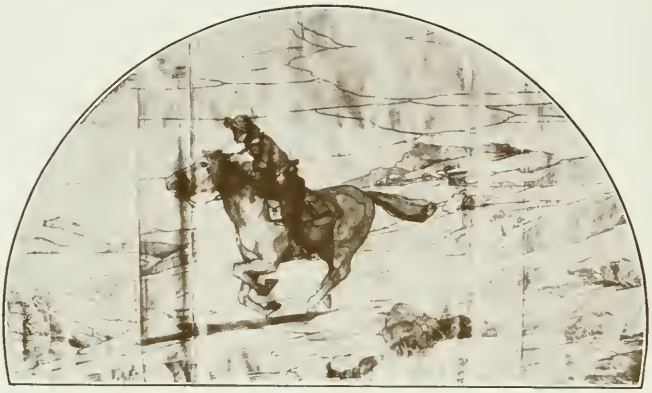
DURING the past twenty-five or thirty years extensive and very expensive experiments have been made with the end in view of introducing as a building material, a magnesia compound to take the place, in a measure, of ordinary hydraulic (Portland) cement. As for results, some of them have been pleasing as far as appearance is concerned. As for durability, the earlier experiments were not successful, and the later experiments have not had sufficient time to prove themselves. At the present stage of the development of oxy-chloride-magnesian cements, they are not as cheap as ordinary Portland cements. The life of an artificial stone exterior for a building, church or otherwise, should be measured not by years but by decades. In light of this fact, magnesia or magnesite cement plaster or finish has not been used in California for a long time. It certainly is not displacing Portland cement mortars at present. What it may do in the future is a question for years to answer.

WILLIAM B. GESTER, C. E.

* * *

Concrete

Concrete is more than structural engineering material. It is not limited, and inert like steel, tile, brick and stone. Structural concrete is potent in wonderful possibility, a great socializing agent. It means for all the people, pure water, clean streets, good sewerage systems, unburnable school-house floors, safe bridges, hygienic houses and infinite hydraulic power development.—Exchange.



Pony Express

Art Glass Windows Depict Western Life in Realistic Fashion

THE possibilities of landscape and pictorial work in art glass have been brought out in an impressive manner by Harry R. Hopps in the five stained-glass windows, now the talk of every visitor to the new Union passenger station of the Southern Pacific Railroad at Salt Lake City. Designed and executed by this well known artist, the windows are the wonder of the Mormon State and of every transcontinental passenger who has been fortunate enough to catch a glimpse of them in his journey through the city.

Hopps was given carte blanc by the railroad people who wanted something expressive of modern progress as well as typical of the early days of the far West "before the Gringos came." It is doubtful if the artist with his brush and palette could blend more beautiful colors and paint upon the canvas more life-like figures. Each window is complete in itself, depicting some scene of Western life, both old and new.

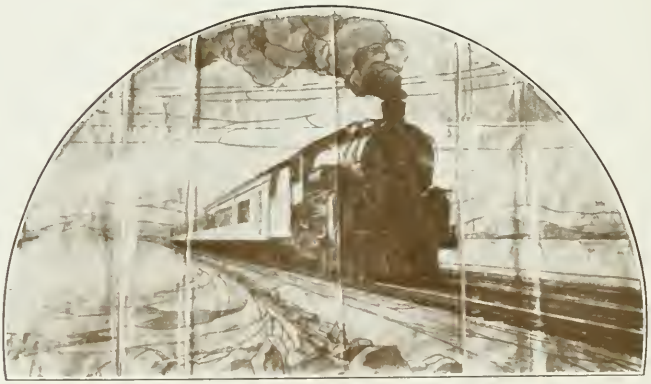
The windows are five by ten feet and the figures are practically life size. The work is done in mosaic glass, no paint whatever being used for outlines or coloring. All the scenes are executed in rich, warm tones that are as restful as they are pleasing to the eye. The work was executed from actual working drawings by Mr. Hopps in his San Francisco studio, and upon completion the windows were shipped in a special car to Salt Lake City.

There are five windows in the group. One represents the "Pony Express," illustrating the means of early transportation. Another window shows the "Overland Mail," which carried Uncle Sam's valuables before the days of the locomotive. Another window shows a buffalo herd, while a fourth window is a faithful picture of one of the early smelting plants. The fifth window shows a Southern Pacific Overland crossing the famous Lucin cut-off.

Overland Mail

Buffalo Herd

Boston Smelter



Lucin Cut-off

Senator Newlands Would Hold Panama-Pacific Exposition on San Francisco Water Front

A plan to hold the proposed Panama-Pacific Exposition in 1915 on the San Francisco water front was unfolded by United States Senator Francis G. Newlands to the members of San Francisco Chapter, American Institute of Architects, at a special meeting in the grey room of the Palace Hotel September 15th. Mr. Newlands prefaced his remarks by saying that San Francisco ought to have the sympathetic support of the entire civilized world in its propaganda for the World's Fair. Universal interest and admiration have been aroused by its marvelous restoration, and it has been fitly termed the "Miracle City."

Among the other guests were Mr. Luther Waggoner, the engineer, who recently returned from a trip abroad where he went to study water front developments, and Mr. C. E. Grunsky, one of the Panama Canal engineers, both of whom addressed the Chapter along lines covered by Senator Newlands, and enthusiastically endorsed the water front idea.

"The World's Fair," said Mr. Newlands, "is pre-eminently a commercial enterprise. Its purpose is to emphasize the pending development of the commerce of the Pacific and the importance of San Francisco as the chief commercial city on the Pacific Ocean. It should, therefore, be not a mere fiesta, but should create permanent value in promoting the facilities of transportation and commerce, upon which the growth of San Francisco will depend. It should have two purposes in view—the promotion of the facilities of transportation and commerce and the improvement of the external attractiveness of San Francisco.

"The first thing," continued Mr. Newlands, "that strikes the eye of the traveler approaching San Francisco, either by ocean or overland, is its water-front. There the eye rests on a scene of unexampled ugliness, in great contrast with the work of Nature, which has made the Bay of San Francisco superior to all other harbors in beauty and capacity, and has united there magnificent views of ocean, bay, islands and mountains. Mere utility has been the chief consideration in the development of the water-front; and even from the utilitarian point of view the development has been rather accidental and straggling than scientific and practical. On the water-front ship and car are to be brought together in such a manner as to facilitate transportation—the most important factor of commercial development."

Mr. Newlands referred to the fact that modern and art engineering are now combining everywhere in the development of such localities. He referred to the Thames embankment, the elevated banks of the Seine, the recent plans for placing the water-front of New York under the direction of the best architects and engineers, the unique park development of the Bay of Rio Janeiro, the artistic development in Oriental ports, where the "bund," a combination of park and esplanade, forms a part of every water-front, the attractive Luneta of Manila, designed by Spanish artists and developed by Burnham, the plans for Antwerp, which, anticipating the work of the next fifty years, covered every phase of utilitarian development and landscape and architectural attractiveness.

"Would it not be well," Mr. Newlands inquired, "to consider, with the aid of competent experts, the advisability of a water-front exposition, embracing the development of the water side of East street from Telegraph Hill to Rincon Hill, including those hills, and if necessary, lands adjacent thereto and possibly

Yerba Buena Island, in such a way as to promote the utilitarian purposes of commerce and transportation and at the same time permanently secure attractiveness of appearance?

"In forming a conception of such a development," Mr. Newlands said, "it will be necessary to blot out of mind the ugliness of the present water-front and imagine it, in connection with Telegraph and Rincon Hills, transformed by the genius of the best architects and engineers, in such a way as to combine utility with beauty. The space between the two hills is a little over a mile. On this space buildings resembling the Ferry building could be put up, connected with each other by an elevated esplanade on the water side, for the use of automobiles, carriages and pedestrians, forming the approach to the second story of these buildings, which would be used for Exposition purposes, the ground floor being utilized for the present commercial purposes. This esplanade could cross East street at Telegraph and Rincon Hills, and on portions of these hills, which would be purchased or condemned, there could be an extensive development, representing the best work of architects, engineers and artists, in the form of Exposition buildings, terraces, water-falls, electric fountains, and statuary. The esplanade would be one of the most effective things in the city, affording convenient views of the incomparable scenery of the bay, islands, ocean and mountains, and also of the great commercial activities of shipping and commerce at the wharves.

Transportation Development.

"If the railroad companies would co-operate with the Exposition company, the probable result would be the erection of a beautiful terminal passenger station by the Southern Pacific Railroad Company opposite the ferry, the approach to which from Third and Townsend, it is said, the railroad company has already secured. Then, in addition, with the consent of the Federal government, arrangements could probably be made with the railroads and the government for a combined development on Yerba Buena Island, which would embrace the existing naval training school, any proposed fortifications, the partial leveling of the islands at the expense of the railroads, and the construction of a beautiful terminal passenger station, and an extensive development for exposition. One can imagine how the plans of the government, the railroads and the exposition managers could be so dovetailed as to make this development one of great attractiveness. The crossing, then, on the ferry would not take more than three or four minutes, and the development of the water-front and of Yerba Buena Island would make a water scene of almost Venetian beauty.

Financing.

"It should be recollected," Mr. Newlands said, "that the use of the water-front, including East street, belongs to or is under the control of the State. The only land that it would be necessary to purchase would be the high parts of Rincon and Telegraph Hills, which properly belong to the park system of San Francisco, and which can now probably be purchased more advantageously than at any other time, for much of the land has not been improved, and such improvements as have been made are of an inferior character.

"Two-story buildings on the water-front, such as the Ferry building, could be constructed of reinforced concrete, and after the fair is over use could be made of these stories for warehousing, for free markets, for expositions and other purposes. Thus, without interfering at all with the practical utilization of East street and the water front by the Belt Line Railway, street cars, wagons and trucks, San Francisco would have an

elevated second story structure between Rincon and Telegraph Hills, the esplanade of which could be attractively improved with palms, trees, and electric development which would delight the sight-seers and amusement-seekers, and from which all the varied and instructive activities of commerce and transportation could be viewed without inconvenience or discomfort."

Mr. Newlands called attention to the bond issue of $9,000,000 by the Harbor Commission, which is to be submitted to the voters for approval at the next election. The principal and interest of this bond issue, he said, will be paid out of harbor dues, and not by general taxation; and should this expenditure be authorized it would be possible for the Harbor Commissioners to unite the utilitarian and commercial development of the water-front with the purposes which the exposition managers have in view.

Mr. Newlands also suggested that if Goat Island could not be secured, a large area of land immediately north of Telegraph Hill toward Fort Mason could be secured by carrying the sea-wall farther out and reclaiming the submerged land by the grading of Telegraph Hill. This space between Telegraph Hill and Black Point would probably remain as a permanent park development, resembling the Luneta of Manila or the water-front park of Rio Janeiro. Thus the esplanade, the water-front development, and the park development of Telegraph and Rincon Hills could be connected with the general park development of the City, which would embrace additional portions of the entire water-front, as well as the Presidio and Golden Gate Park.

Mr. Newlands dwelt upon the value of the attractiveness of San Francisco to the travelers and tourists as a commercial asset, and contended that whilst pursuing lines of utilitarian development, San Francisco should, in its external appearance and particularly on its water-front, be made so attractive as to arouse the admiration of the traveling public.

Mr. Newlands dwelt upon the practical character of a water front development, as compared with a mere suburban development, such as was contemplated either at Golden Gate Park or Lake Merced, showing that for this suburban development about $17,500,000 would be available, most of which would be invested in improvements of a mere temporary character that would fade away when the exposition was ended; whilst under the other plan, by the union of the transportation companies, the Harbor Commissioners and the exposition managers a concentrated expenditure of over $30,000,000 could be made at the most conspicuous part of San Francisco, and in such a way as to make every dollar count in the future progress, development and commercial activity of the city.

Mr. Newlands referred to the prominent part which the architects and engineers of the country were taking in the creation of a public opinion that would demand not only a substantial but an artistic development of the country. He referred to the success of this movement in the appointment of a National Commission of Arts by the President, of which Mr. Burnham was chairman, and such exposition developers as Hastings, of Carrere & Hastings, Olmsted, the landscape architect, and Cass Gilbert were members. President Taft had suggested that this commission should be consulted by the exposition managers, and certainly no better suggestion could be made, for it involved the utilization of an organized body of vast experience in such matters, a body which had the entire confidence of the artistic and engineering societies of the country, and which would bring the local architectural, artistic and engineering organizations into harmoni-

ous action. He trusted that the architects and engineers and artists of San Francisco would take up with energy the work which had been inaugurated by their Eastern brethren in the organization of art commissions, State and municipal, which could co-operate with the National Commission, and which would powerfully represent the public opinion in all matters concerning public works.

Luther Waggoner spoke as follows: "The only thing I have to say, Mr. Chairman and gentlemen, is that Senator Newlands has talked to me about this, and it is structurally sound. There is absolutely no difficulty in the way of securing a good foundation for carrying out any of these waterfront improvements. With the present method of driving a large tube down the mud line and driving piling in that, if necessary, and filling with concrete in the dry, it is possible to secure a foundation of any desired stability, so that structurally there is absolutely nothing to prevent carrying out the plan.

"I am heartily in sympathy with it, for the reason that we will have something permanent for all time, and it is such a large amount of money to be spent, that it strikes me it is a most rational thing to try and spend it right along the waterfront, and then we will have twenty or thirty, or maybe forty, million dollars worth in the nature of practically permanent improvements, and a beautiful waterfront. If I am not mistaken, Antwerp is a city where they have laid out very comprehensive plans, which will take thirty or forty years to execute. It involves straightening out the River Scheldt for five or six miles in length and cutting new dykes, building artificial dykes, that will be put on each side, to about a mile in length. The government began this work by appropriating the necessary lands, so they have a belt of land about five and a half miles long by (in places) two miles wide. When completed, there will be an orderly development with parks, boulevards and railroad connections. Some of the details of it are not finally determined, but the government has had the wisdom to secure the land, and has already executed and opened to business the first two sections. This is an example—and there are numerous others—where a certain amount of beautification has been effected. Rotterdam is another instance. The beautiful waterfront park does not interfere at all with its utilitarian purposes, and immediately back of the narrow park are the fashionable hotels and residences. The pressing demands of commerce are so great with these cities that they absorb all the ready money to make the necessary improvements for purely commercial purposes, but they have an eye for the aesthetic side of it, and are trying to realize upon it. Now here we have the opportunity of a lifetime, and I think we ought to get together, formulate some sort of a plan and educate the people to the advantages of your ideas."

Mr. Grunsky spoke in part as follows: "I am delighted to listen to Senator Newlands and the suggestion which he made, and it is to me an entirely novel one. It had not occurred to me that our water front might be used in that way, but from an engineering point, as has already been stated, I can see no reason whatever why it cannot be carried out. Of course there will be some little difficulty, as has already been mentioned here, of combining the pleasure feature with the main purposes of the fair, but aside from that I see no reason why the suggestion could not be worked out under practical lines. It certainly would place the fair where it is the nearest to the center of population around the bay. It makes it so easy of access to the other side."

Mr. Grunsky then alluded to the fact that Goat Island might be utilized, saying that in the course of time the island would be a great union station.

Figure 4

Waterproofing of Engineering Structures*

By JOSEPH H. O'BRIEN.

THE purpose of this paper is neither to record the history and development of the art of waterproofing nor to discuss the merits of the various methods employed, but simply to present some points of possible general interest, and to briefly describe waterproofing by use of pitch and felt, of certain viaducts, retaining walls, cut and cover tunnels, pipe subways, elevator pits, conduit banks, etc., which have been designed and constructed in New York City under the writer's supervision. The work to be described was performed under three separate contracts, but the materials used were the same in each case, the specifications varying only as to number of plies, methods of procedure and character of backing, or protection of waterproofed surface.

The clauses of specifications, which apply to materials and application, are as follows:

Pitch used shall be straight run coal-tar pitch, which shall soften at 60 degrees fahr. and melt at 100 degrees fahr., being a grade in which distillate oils distilled therefrom shall have a specific gravity of 1.105.

The felt shall be "Hydrex" felt, manufactured by F. W. Bird & Son, East Walpole, Mass.,* or felt equally satisfactory to the engineers.

*Read before the Boston Society of Civil Engineers, and [illegible] from the Journal by courtesy of the Association of Engineering Societies.

**Now the Hydrex Felt and Engineering Company.

-SECTION SHOWING SHINGLE LAP WATERPROOFING-
-6 PLY WORK-

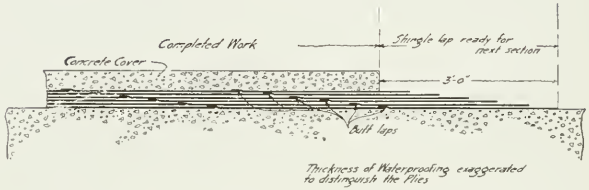


Figure 1

Pitch, when applied, shall be of a temperature of not less than 250 degrees fahr. The pitch shall be mopped on the surface of the masonry to a uniform thickness of not less than 1-16 inch. Each layer of pitch must completely cover the surface on which it is spread without cracks or blow holes. The felt must be rolled out into the pitch while the latter is still hot and pressed against it so as to insure its being completely stuck to the pitch over its entire surface. Great care must be taken that all joints in the felt are well broken, and that the ends of the rolls of the bottom layer are carried up on the inside of the layers on the sides, and those of the roof down on the outside of the layers on the sides, so as to secure the full laps herein specified.

Other important clauses are:

It is intended that the interior of waterproof structures shall be permanently free from moisture or discoloration due to the percolation of water or other liquids from outside sources. This end shall be attained by means of a continuous flexible waterproof sheet surrounding the exterior of the structures (as shown by drawings).

Waterproofing must be protected against injury at all times to the satisfaction of the engineers.

Any waterproofed structure that is found to leak at any time prior to the completion of this contract, shall be made tight by the contractor in a manner satisfactory to the engineers.

Waterproofing will be measured by the square of 100 superficial feet and paid for accordingly.

Composition of the waterproof sheet is specified as follows:

For all construction, except electric conduit lines and electric conduit manholes, waterproofing shall consist of six layers of felt and seven layers of pitch alternating, and shall consist of four layers of felt and five layers of pitch alternating, for electric conduit lines and manholes, each strip to lap not less than one foot upon the previously laid strip, and each section of waterproof sheet shall lap at least one foot with the adjoining section.

The specifications have, in most particulars, served their purpose admirably, but the following comments may be of interest:

The felt used comes in rolls 36 inches wide, and each roll contains 400 square feet. The method of practical procedure to be followed in placing the felt so that the specification requirements as to laps might be complied with, caused much concern.

In the writer's judgment, the most effective way to lap the plies is by the "shingle method," or, as sometimes called, the "feather-edge method," similar in principle to that employed in pitch and felt roofing; but it is evident that with felt sheets only 36 inches wide, the prescribed lap of 12 inches cannot be effected in six-ply work by the "shingle method," and because of the superiority of this method, it was concluded to fit the laps to the felt, and the work was actually carried out wherever practicable with 6-inch laps "feather-edged" or "shingled." The felt was laid transversely of the structures. The requirement "each strip to lap not less than 1 foot upon the previously laid strip" occasioned some confusion, owing to the fact that it might be interpreted to mean that each 36-inch

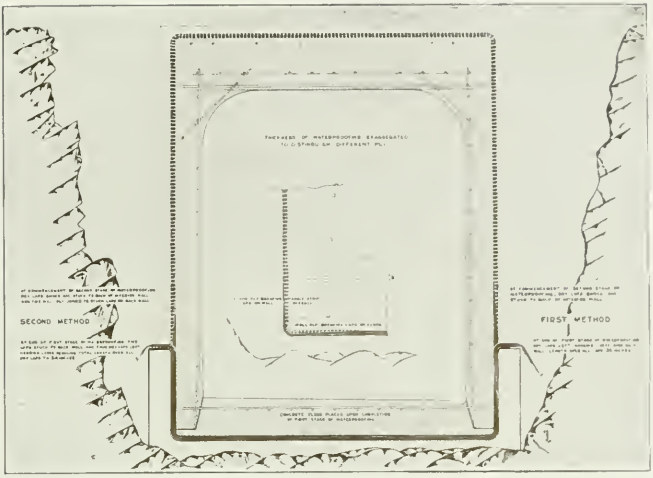
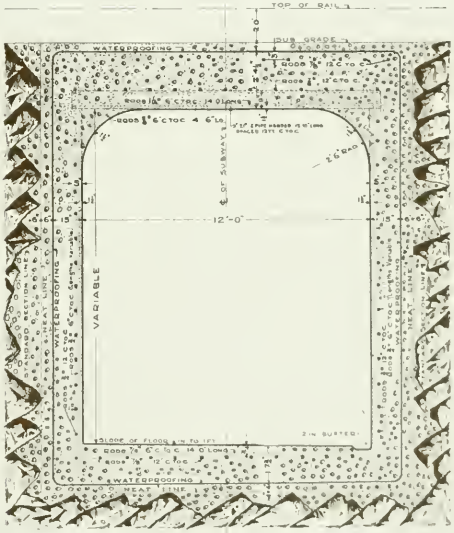


Figure 2 and (in center) Figure 2-A



TYPICAL SECTION
OF 12 FT TRUCKING AND PIPE SUBWAY

Figure 3

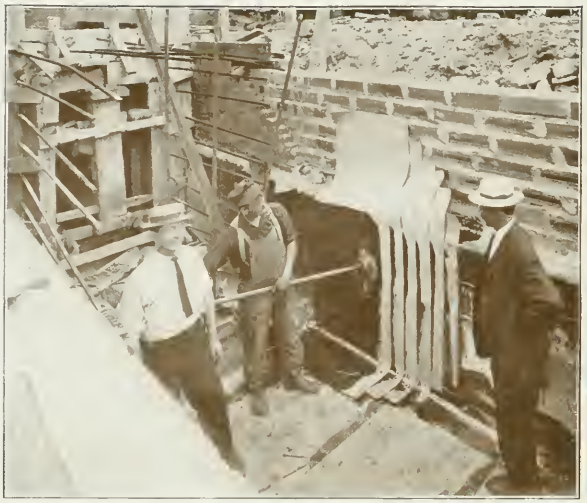


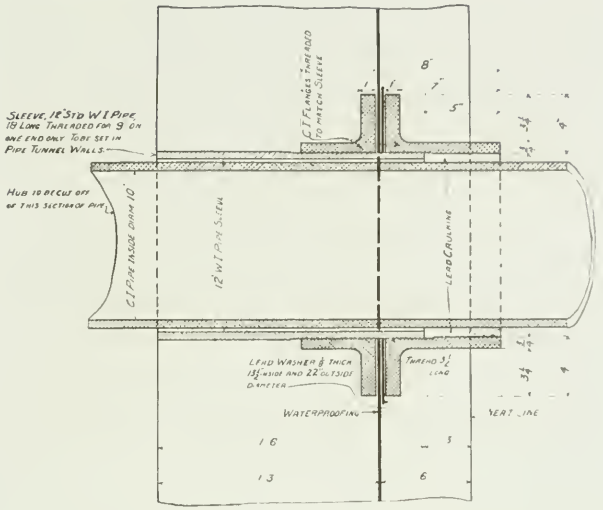
Figure 4-A

strip should lap the prescribed amount at edges and ends over the previously laid strip of the ply of which it was a part, but as this was manifestly impracticable, the requirement was interpreted as applying to the relation of the joints in one ply to the joints in the ply beneath it, as was doubtless intended; but, as stated above, the lap was reduced to 6 inches.

The usual waterproofing practice of sticking each strip to its neighbor by lapping at least 1 inch was followed in making up each ply. The writer believes that a better result will be obtained, however, if this butt lap (so called) be made 2 inches wide.

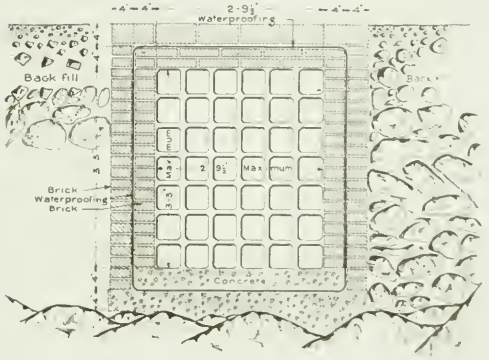
The system of shingling adopted keeps the shingle at the head of the work with all six plies in evidence, and with all sheets securely stuck, as shown in Figure 1. Thus the waterproof sheet is entirely completed back of the shingle lap, and may be covered and permanently protected up to the lap. By this method there is little difficulty in obtaining the correct number of plies, and, in the writer's opinion, the method gives the best obtainable quality of work.

In providing for connection of two sections of standing work, as in subways, or for connection of standing work and flat work, as at tops of walls, dry laps were left, which appeared at first to be the only solution of the problem which would insure a continuous waterproof sheet of the character intended; but on six-ply work this procedure required that dry ends of sheets varying from 6 inches to 36 inches be left, in order to effect the shingle bond with the flat or standing work, as the case might be. (See Figure 2.) Despite the specification requirements that "waterproofing must be protected from injury at all times to the satisfaction of the engineers," the writer does not hesitate to state that it was quite impracticable to protect dry laps, and despite all efforts made to do so, such laps were


SLEEVE, 12" STD W.I. PIPE 18" LONG THREADED FOR 9" ON ONE END ONLY. TO BE SET IN PIPE TUNNEL WALLS.
HUB TO BE CUT OFF OF THIS SECTION OF PIPE
C.I. FLANGES THREADED TO MATCH SLEEVE
12" W.I. PIPE SLEEVE
LEAD CAULKING
C.I. PIPE INSIDE DIAM. 10"
LEAD WASHER ⅛" THICK 18" INSIDE AND 22" OUTSIDE DIAMETER
THREAD 3½" LEAD
WATERPROOFING
YEAR LINE
8"
7"
5"
3¼"
6"
1 6
1 3
6

SLEEVE FOR 10 IN. C.I. PIPE.

Figure



Figure

invariably found almost wholly destroyed and unfit to join on to, when ready to proceed with the connecting waterproofing.

The destruction of dry laps was due to various causes, such as dragging timber and other materials over them, deposits of debris and of concrete from the work preceding the next waterproofing stage, traffic of laborers over them, and last, but by no means least, the absorption of water. If the felt becomes water-soaked, it is thereby destroyed. The saturation and coating of high-grade felts, such as that used on the work described herein, renders the sheets impervious to water on their surfaces, but the edges are not impervious, hence the necessity for so conducting the work that the edges of the felt be at all times protected from the influence of water.

To overcome the trouble experienced with dry laps, the total lap was reduced from 36 inches to 24 inches for connections of standing work, sticking the two first sheets solid on the top of the backing wall, leaving four dry laps of 6 inches, 12 inches, 18 inches and 24 inches for the remaining plies. (See Figure 2.) Then when the joining was effected, four plies were carried through by shingle method, and two plies were stuck by solid lap method. Due to the reduction in width of total dry lap, the felt was more easily preserved, but the destruction of these laps was not wholly avoided.

The writer believes that, under similar conditions, the best procedure would be to reduce the dry laps to two plies and stick four plies with solid lap. This solution of the difficulty is wholly a practical suggestion, which does not satisfy theoretical consideration of the problem, but will none the less give good results.

The instances of dry laps so far discussed and illustrated were an incident of the construction of the reinforced concrete subways, for pipes, wires and express trucking, about a mile of which, varying in clear width from 6 feet to 17 feet, have been constructed beneath track grade. The procedure which brought about the above-noted conditions may be more readily understood if we depart a little from the subject and briefly describe and illustrate a typical subway. The cross-section (Figure 3) shows a subway 12 feet wide, and varying from 12 feet to 17 feet high inside, designed to carry a railroad on its roof, and to resist hydrostatic pressure, due to an assumed head, measured from the average level of the open joint drainage system, which is about 1 foot 6 inches below the roof of the subway. It will be noted that the excavation is wholly in rock, and the drawing requires that a volume be excavated only 6 inches wider on each side than the neat section. The nature of the rock was such, however, that the trench was blown out from 5 feet to 10 feet wider than required in places.

The first step after completing the excavation was to build the floor base and backing walls ready for waterproofing.

After careful consideration, it was determined to make the backing walls 12 inches thick, and to limit their height to 4 feet in the first stage. (See Figure 2.) The height determined upon was sufficient to keep water out of the waterproofed trench, except occasional flooding after heavy rains, and it was a convenient bench from which to work in placing rod reinforcement against interior forms, and upon which to construct exterior forms of the subway. It was considered, owing to lapse of time which must ensue in constructing the monolithic tube within the waterproof enclosure, that standing work would probably often be lost if carried higher than 4 feet, by sags due to weight of fabric and augmented by temperature exposure. Likewise the danger of damaging the fabric while building the

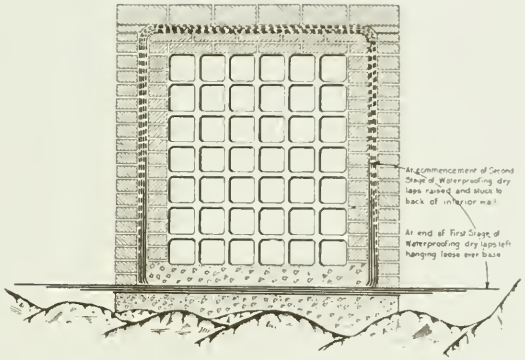

At commencement of Second Stage of Waterproofing dry laps raised and stuck to back of interior wall
At end of First Stage of Waterproofing dry laps left hanging loose over base

Figure 7

reinforced tube inside of it was anticipated. Fears in respect to these matters were fully justified, as illustrated, by the case of an 8-foot subway, which was so situated that the complete waterproof sheet had to be placed up to the roof connection, and the subway built within. Much valuable waterproofing work was destroyed in this trench, due to the causes above cited.

Another point bearing upon the practical application of the felt in the first stage of the subway waterproofing, above referred to, and in similar situations, is the importance of so making angles and corners that they will be durable during construction and tight after. Angles at junction of flat and standing work are natural weak spots in pitch and felt waterproofing.

In the subways referred to, the first scheme tried required that the sheets be carried full across the floor and up both backing walls in one continuous strip, but two very serious objections to this procedure soon became evident. In the first place it was impracticable to securely stick the sheets throughout, especially at the angles of floor and walls, and as a result, the standing work bulged and sagged. In the second place, the scheme resulted in much waste of material, and annoyance to the contractor, who was accustomed to cut and fit according to his material, with a minimum of waste.

The method was changed, therefore, so that the floor plies would break joint with the wall plies, partly on the wall, and partly on the floor, as shown in Figure 2-A, and as an additional safeguard a strip was laid longitudinally and fitted snug into the angle over all, and this was found to be a very practical and satisfactory solution of the detail.

Figure 4 shows the waterproofing of floor and backing walls, proceeding according to the method last described. Figure 4-A clearly shows the method of waterproofing backing walls of subways. It was found necessary to leave openings in the walls of pipe subways for pipes varying in diameter from 1½ inches to 12 inches, and in order to insure a water-tight job upon completion, screw sleeves with sheet lead washers, and with calking rims were devised, as shown in Figure 5. The pipe sleeve details were designed to permit of the introduction of the pipes after the subways had been completed. The sleeves were easily applied and the use of them has so far resulted in tight work.

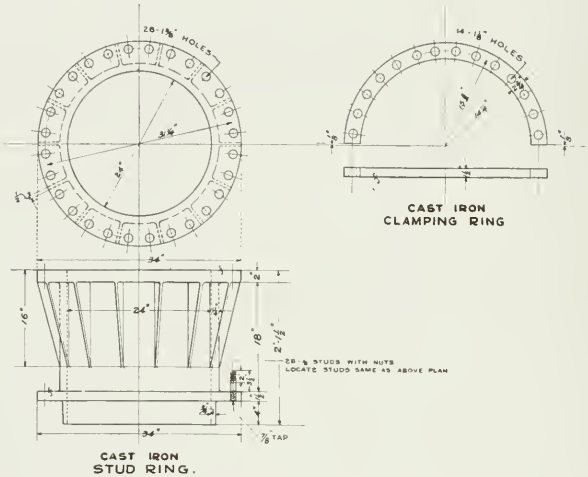


Figure 8. Detail of Castings for Waterproofing Hydraulic Elevator Pits at Plunger Cylinder

In conduit bank waterproofing, several miles of which were included in the work herein described, dry laps were left at first on the flat at the floor base, owing to the necessity for laying conduits in advance of placing the side wall and roof waterproofing. Figure 6 shows section of typical conduit bank, and Figure 7 shows first stage of waterproofing with dry laps.

Practically all of the laps beyond the edge of the masonry base were found to be destroyed when the conduits had been made ready for completion of the waterproofing, hence the laps were reduced successively to two dry and two stuck, and finally to all four stuck of the width of base projection beyond the conduits. Wherever conditions made it possible to require the construction of the complete waterproof basin to the top of the conduits in advance of laying the latter, this practice was followed, but while it produced the best job of waterproofing, it required the construction of the conduit bank end on in a narrow trench, at the risk of bad duct alignment. Furthermore, the rate of progress by this latter method was very much less than by the method generally followed.

In the writer's judgment, however, and despite the fact that tight work has been obtained by the method of first placing the floor sheets, joining the wall and roof sheets to them, after the duct bank was made ready, it would be better, where similar work is required, henceforth to design the waterproofed trench of sufficient width, and with suitable backing walls to permit of the construction of the ducts in the usual manner, after the trench has been completely waterproofed.

Waterproofing of baggage lift pits was placed in accordance with the principles outlined above for pipe subways, but the pits were open at the top and one end, and the waterproofing problem was complicated by the presence of foundations for superstructure columns, and by the necessity of providing for plungers.

It was determined that the plunger borings should be made after the baggage lift pits were completed, and to insure a water-tight pit, a plunger casting was devised, with a clamping ring and stud ring, between which the waterproofing was placed (see Figure 8).

This casting had to be set accurately and securely in position, hence the base course of concrete was carried through beneath it, and the casting was set on same, and stayed by lateral bracing during the placing of the finished work. The detail of the casting required that the connecting sheets of waterproofing be cut to fit the stud bolts, which was a rather unusual waterproofing detail, but a very satisfactory result was obtained.

Due to a necessity which arose, bearing upon the general advancement of the project, the backing walls of two baggage lift pits, which had been excavated for most of their height through earth, were placed in the form of retaining walls some months in advance of the completion of the lift pits, and construction tracks were carried over them on temporary trestle stringers.

After the floors of these pits were completed, the steel framing of the walls (composed of 15-inch I-beam studs, set apart 4 feet 0 inch centers) was erected, in advance of completing the waterproofing, because it was feared that the waterproofing, if completed first, would be destroyed during erection of the steel. The procedure followed made the placing of the waterproofing a very difficult job. To overcome the difficulty, mats were prepared to fit the spaces back of the beams. These mats were made up of sheets varying in width from about 12 inches for the sheet next to the beam flange to 36 inches for the sheet next to the backing wall. The mats were made up and mopped complete on the adjoining subway roof, and were lowered into place and securely stuck. After any two mats of a panel had been placed, the intervening space was waterproofed in the usual manner. The joining between floor and wall work was effected by solid lap method, and the joint was protected by three courses of brickwork in Portland cement mortar, set about 3 inches away from the wall waterproofing, thus forming a pocket which was filled with pitch.

In the case of one viaduct which was constructed under an avenue, the waterproofing was placed to full height of walls, and turned down on top of same before the backing was placed, dependence being put in the adhesiveness of the waterproofing, and weighting down of top of same while backing was laid. When the backing followed immediately after waterproofing, this scheme worked out all right, but when the backing was delayed, the waterproofing sagged and bulged badly, and in some cases had to be renewed. Hence on walls and elevated railway foundations of another avenue viaduct the waterproofing was carried up in first stage to height of 5 or 6 feet, the work being stuck securely in each stage and backed up immediately.

Due to necessity for transfer of street railway, sewer, water and gas pipes from temporary to permanent supports, during construction of the latter viaduct the floor plate work had necessarily to be finished in some instances within 18 inches to 20 inches of walls and piers, in advance of waterproofing the latter. In such instances the shingle lap method was abandoned and the floor waterproofing was carried through solid against the walls or piers, and when the latter were ready, a six-ply flashing of waterproofing was placed over the angle of floor and wall and extended up the wall, and out on to the floor waterproofing. Over this flashing the wall waterproofing was placed and carried out over full width of exposed floor waterproofing, making a very satisfactory job of solid lap work. Figure

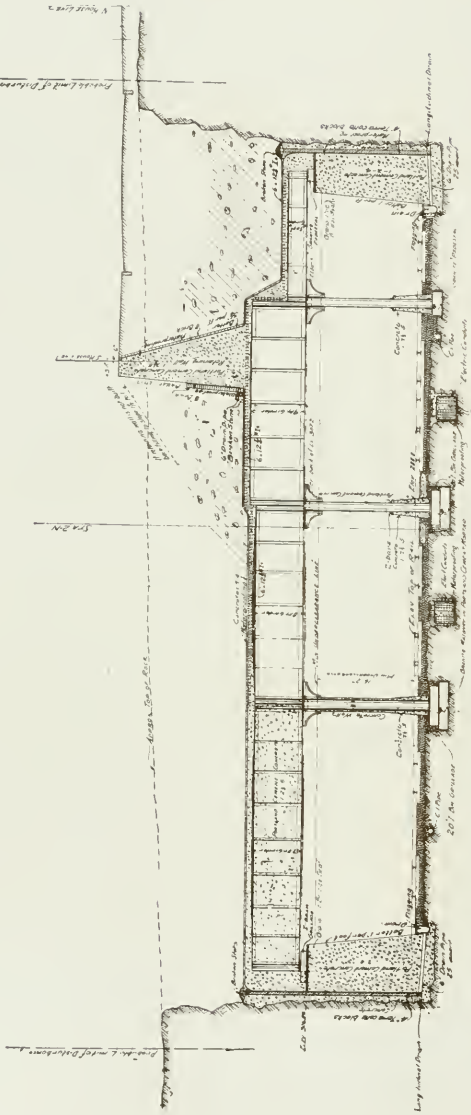


Figure 10

Figure 9

Figure 9.4

9 shows the application of waterproofing to walls, also flashing of angle of floor and walls in manner last described. Figure 9-A shows waterproofing in progress on the deck of a viaduct under a street, and is introduced to show the more simple type of viaduct roof work. Figure 10 shows a cross-section of a cut and cover tunnel.

The principles of application of the waterproof sheets hereinbefore described for other work apply with equal force to this cut and cover work. The writer will, therefore, briefly describe the mode of procedure in the general construction of this work, so that a few points of interest may be brought out, which are partially, though not wholly, related to the waterproofing problem, but which may be of sufficient value to warrant the liberty of a description in this paper. As will be noted by reference to Figure 10, the tunnel roof is composed of steel girders resting on concrete abutment walls and intermediate columns, all founded on solid rock. The excavation from an average elevation of 10 feet above the roof was entirely in solid rock, and owing to franchise requirements, together with the fact that a portion of the work encroaches on very valuable private property, it became the engineer's duty to restrict the over-all width of the excavation to a minimum.

The roof of the structure is at an average depth of 20 feet below street level and about 9 feet below sewer level, and the track sub-grade is at an average depth of 49 feet below the street level, 38 feet below sewer level and 12 feet below mean high water.

It was apparent that, owing to the above conditions, some surface water and the ground water below sewer level would have to be effectually shut out, and under less restricting conditions the design of abutment walls, capable of resisting hydrostatic pressure due to a head measured from bottom of sewers might be warranted. After due consideration, however, it was determined to design the abutment walls of suitable section to safely support the vertical loads to be carried by them, trusting to a free drainage scheme to relieve these walls of hydrostatic pressure. The writer devised a free drainage scheme, which is illustrated by Figure 11, and

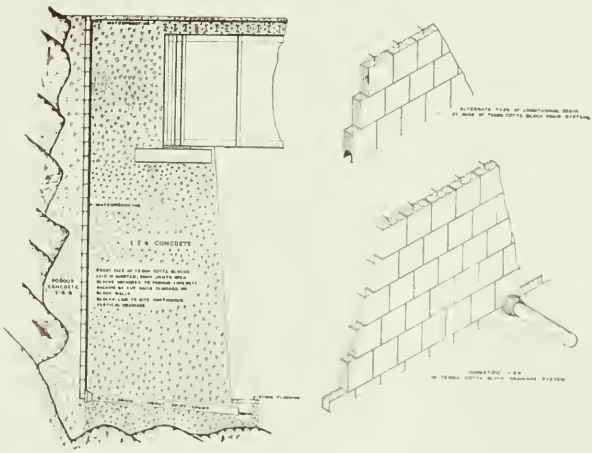


Figure 11

which, owing to the fact that it has been completed and doing good service for over a year, may be pronounced a success.

The scheme consists merely of the application of well-known materials in a simple but unusual manner, namely, the space from standard section line to ledge, varying from 6 inches to 4 or 5 feet, was filled back of a suitable form to full height of abutment walls with a porous concrete, 1 part cement, 4 parts sand and 8 parts broken stone. This porous backing was faced with hollow, light-burned, porous terra-cotta partition blocks, 12 inches by 12 inches by 4 inches, laid with openings set vertically and bonded for continuity of vertical hollow spaces. These blocks were anchored to the concrete backing by cut nails, driven into the latter and clinched over the inner walls of the blocks at joints. The bed joints were buttered in such manner that the back half of the joint was left open as far as practicable and the build joints were similarly made.

This tile drainage sheet was at first footed on a longitudinal tile drain, made by splitting out end cells from the blocks and laying same on bed. Due to the underburned quality of the material many blocks were wasted in an effort to produce one suitable end cell. Hence the type of longitudinal drain was changed to that shown in the upper right-hand corner of the plate. The end walls and partitions of the blocks were chipped out to approximately the form shown, by use of a bricklayer's chipping hammer, and thus the longitudinal drain was obtained with very little waste. This longitudinal drain is connected with a gutter at the toe of the abutment wall, which is, in turn, connected to the underdrainage system. Upon the face of the tiling above described, the wall waterproofing was placed for full height, with dry laps extended over the backing wall and weighted down. A section at a time, varying from 25 feet to 50 feet, was thus prepared and the abutment walls completed as soon as practicable after waterproofing.

As may be readily understood by reference to Figure 10, many months elapsed after waterproofing abutment walls before the roof work was connected and the dry laps were found to be very seriously damaged. The roof work was advanced a section at a time, dependent upon the opportunity for moving equipment, and the roof work sections were of varying areas, and frequently broke part way over the roof. This work was all performed by the shingle method, hereinbefore described, but the patchy procedure on the roof was permitted solely because of the contractor's obligation to make the work tight. The writer is convinced that a better result will be secured if roof or other flat waterproofing is extended full across the work, thereby leaving joints at one edge only.

After the roof waterproofing was completed, it was covered with concrete, varying in thickness from 4 inches to 6 inches, and the highways were restored by backfilling over this cover to a height of about 20 feet. So long as the backfilling was kept well back of the end of the completed work, and was stepped off in bench formation, the plain concrete cover served its purpose, but in one case when the backfilling was advanced in bank formation, close upon the completed construction work, the concrete cover broke and the waterproofing was damaged, requiring removal of much backfilling to effect proper repairs. After the occurrence just cited, the writer had the cover reinforced by Clinton wire cloth, and no further trouble was experienced. This reinforced cover was also used on a viaduct roof which was built after the cut and cover tunnel work just referred to had been completed.

Some additional points of interest in the protection of the waterproofing work described herein are the following:

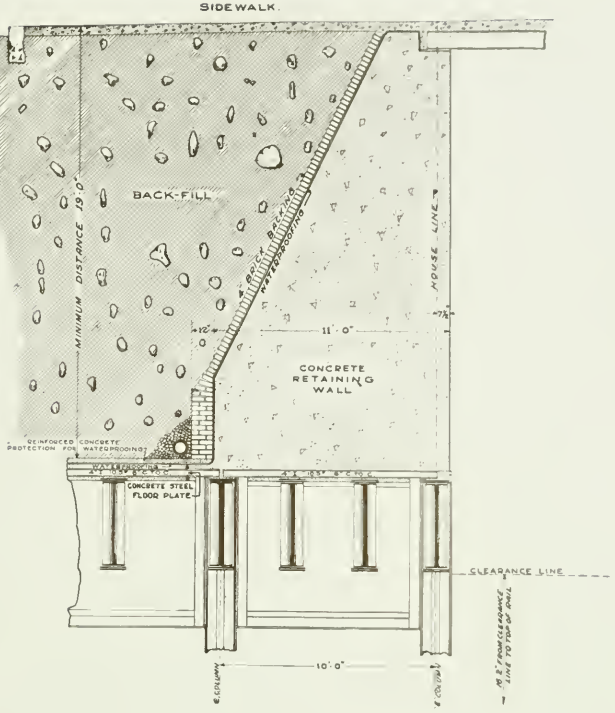


Figure 12

Where excavation for subways below track level was excessive (see Figure 2), the contractors were not required to fill back solidly against the rock, but were permitted to build 12-inch backing walls of concrete and to backfill behind the latter. They came to the conclusion that much time would be saved by using terra-cotta blocks for backing up subway waterproofing above the 4 foot wall shown in Figure 2, and they were permitted to substitute these blocks laid on bed in the usual manner in Portland cement mortar. Recently it became necessary to remodel a section of the subway work, and the adhesion between the terra cotta backing and the waterproof sheet proved to be so strong as to require splitting of the blocks in order to remove them.

An 8-inch brick backing was provided for waterproofing on back of viaduct detaining walls under avenues. During construction of one viaduct a settling down and bulging of the backing wall was noted, accompanied by vertical cracks, due apparently to slipping of the backfilling placed against the wall. To overcome the difficulty, the thickness of the backing was changed from 8 inches to 4 inches and a substantial footing was provided, as shown in Figure 12. No recurrence of the trouble was experienced after the section of the brick backing was modified.

Many schemes were tried for substantial protection of stuck lap joints in cases where these had to be left for long periods of time before connecting work could be placed, but the most satisfactory protection was afforded by covering the laps with 2 inches of clean sand.

No special effort was made to obtain better surfaces upon which to waterproof than result from ordinary practice, but the writer believes that it would be worth while to insist on smooth finish for surfaces upon which to waterproof, so that complete adhesion may be obtained and air cushions, bulges, sags and water pockets avoided, in so far as the quality of the surface waterproofed affects these conditions.

When connection of a new to an old section of work is made, the surface of the old work should be thoroughly cleaned by stiff brooms and flexible wire brushes.

The felt used on the work described herein was selected after many comparative tests and analyses had been made for the purpose by chemists, and the requirements adopted as a result of their investigation are as follows:

The felt must be saturated and coated with asphaltic products and must conform to the following requirements:

(a) The weight per 100 sq. ft. shall be from 12 to 14 lb., saturated, and from 5 to 6 lb. unsaturated.

(b) The weight of the saturation and coating shall be from 1.25 to 1.75 times the weight of the unsaturated felt if coated on both sides, and from 1 to 1.5 times the weight of the unsaturated felt if coated on one side.

(c) The saturation shall be complete.

(d) The ash from the unsaturated felt shall not exceed 5 per cent by weight.

(e) The wool in the unsaturated felt shall not be less than 25 per cent by weight.

(f) Soapstone or other substances in the surface of the felt to prevent adhesion shall not exceed .5 lb. per 100 sq. ft. of felt.

(g) The saturating and coating materials shall remain plastic after being heated to 250 degrees fahr. during 10 hr. The coating not to crack when the felt is bent double at ordinary temperature.

(h) The felt shall be soft, pliable and tough when received from the factory and until placed in the work.

(i) The quotient obtained by dividing the tensile strength in pounds of a strip 1 in. wide, cut lengthwise, by the weight in pounds of 100 sq. ft. shall not be less than 7.

(j) The quotient obtained by dividing the tensile strength in pounds of a strip 1 in. wide, cut crosswise, by the weight in pounds of 100 sq. ft. shall not be less than 3.5.

(k) The strength saturated shall be at least 25 per cent more than the strength unsaturated, taken lengthwise.

(l) The strength saturated shall be at least 15 per cent more than the strength unsaturated, taken crosswise.

The quality specification for pitch quoted in the fore part of this paper was likewise determined after careful consideration by the chemists.

The pitch used differs from the coal-tar pitch known to the waterproofing trade in New England. It is received on the work in a soft, almost fluid state, and spreads splendidly in average and cold temperatures. It flows too freely in hot weather and does not set so effectively in high temperatures, as the harder coal-tar pitch used for waterproofing in New England. The waterproofers obtained a harder pitch for hot weather work which overcame the objection noted in application. It was at first found to be somewhat unreliable as to quality, but the manufacturers succeeded in making a hard pitch with melting point 110 degrees fahr., which had 36 per cent free carbon and was considered satisfactory material for hot weather.

It is important that the pitch be not overheated, as it volatilizes and insufficient body remains. The danger of overheating is minimized if a first-class kettleman is employed. Practical tests relied upon by a waterproofer to determine the proper temperature of pitch in the kettle are

first to observe whether yellowish fumes rise from the kettle, which are an indication of excessive heating; and second, if the pitch cracks too quickly when spat into, it is too hot, but if a very short interval elapses before cracking, it is heated sufficiently. The degree of kettle heat is wholly dependent upon the grade of coal-tar pitch used. For standing work, the pitch may be advantageously heated much less than for flat work. If heated too much for standing work, it falls away from the mop and much of the body of the coating is lost.

It has been observed that the first coating of pitch will adhere to or coat a concrete surface which is just damp enough to be dustless, better than a concrete surface which is dusty dry. A wet or decidedly moist surface is not suitable for pitch and felt waterproofing. If it is necessary to waterproof a surface which has been under water, the surface should be dried by brooming with sawdust. Cement is sometimes used for this purpose, but the result is not quite so effective and it is a more costly method. It requires from 2.5 to 3 gallons of coal-tar pitch per mopping for one square, or 18 to 21 gallons per square for six-ply work.

The quantity of waterproofing placed on the work described herein is 1,000,000 square feet.

In closing, the writer wishes to call attention to the need of practical inspection on waterproofing work. An experienced waterproofer, familiar with the tricks of the trade, and possessed of the proper temperament for the position of inspector, may readily become a most valued assistant to the engineers in charge.

* * *

Unique Design of Ornamental Street Posts

Mission Type Lamp Standard in Use at Riverside Cal. (Courtesy of the Illuminating Engineer)

RIVERSIDE has developed a very original design for their street electroliers. The style of the post has been developed to carry out the idea of "The Mission City." Several of the public buildings are of the old Mission style of architecture, and the reinforced concrete posts are therefore in keeping with the surroundings.

The posts are placed about 100 feet apart, and are lighted with two 100 watt and one 60 watt tungsten lamps. Another interesting feature of the installation is the fact that the design of these posts has been copyrighted and presented to the city of Riverside. This design can therefore be used in no other place. The building shown on the left of the photograph is a portion of the Glenwood Mission Inn.

Los Angeles, by the way, was one of the first cities of the country to adopt street electroliers for illumination of the business district, and this interesting new design of street posts very well illustrates the progressiveness of this locality.

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Concrete Barracks

Plans have been completed by the War Department, Washington, D. C., for barracks and officers' quarters of the permanent cavalry post at Schofield barracks, in Hawaii, with a view to accommodating a regiment of cavalry. It is estimated that these buildings will cost $600,000. They will be of the concrete type. Interest attaches to the officers' quarters, as they are of the new style of architecture known as block construction, such as that provided at Fort Hamilton, N. Y. The quarters are in rows, accommodating six families. They are separate houses, but are built in a block. The quarters at each end of the row are for captains, and those in the center are for lieutenants. The accommodations in all the quarters are about the same, with the preference in the way of outlook for the end houses.

A Plea for Sightly Telephone Buildings

Some time ago the Architect and Engineer published an interesting article on "The Telephone Exchange," by Architect Almeric Coxhead, of Coxhead & Coxhead, San Francisco, and illustrated the paper with some attractive views of Home telephone buildings, designed by the Messrs. Coxhead. A number of congratulatory letters from Eastern architects have been received by the author, which show that this magazine is read not only on the Coast, but all over the world.

The following is an abstract of a letter addressed to Mr. Almeric Coxhead, by Mr. Kempster B. Miller, of McMeen & Miller, electrical engineers, with offices in the Monadnock building, Chicago, Ill.:

"I have received a copy of the Architect and Engineer containing an article by you on the telephone exchange. I have read it with interest and shall keep it in our files for future reference. It seems to me that Mr. Pond in his attempted answer to the criticisms of Russell Sturgis, misses the main point in his justification of the idea of making ornate telephone office buildings. He seems to justify it solely from the standpoint of the workers within the building, and I have no doubt that it can be justified on this ground. It seems to me that the real reason why a telephone office building should be made ornate, or at least should be given a pleasing external appearance, is that in most cases the very nature of its use demands that it shall be located in a densely built-up section of the city. It is, therefore, the general public rather than the inmates of the building, to whom the appeal must be made. To construct a plain, ugly factory building in the down-town district of San Francisco, or of Chicago, or of New York, would be an outrage on the public, and I think that is the answer."

Important Amendment to Los Angeles Building Laws

The following amendment to the building ordinance, relative to the construction of hospitals and sanitoriums, and requiring that they be equipped with fire escapes, has been passed by the city council and is now in force. The new section is as follows:

HOSPITALS, ASYLUMS, ETC.

Section 53. It shall be unlawful for any person, firm or corporation to occupy, use or maintain a hospital, sanitorium, sanitarium or asylum in any building or structure in the city of Los Angeles more than two stories in height, unless said building or structure be of Class "A" construction. The walls and ceilings of every corridor of each floor of such building shall extend from one exterior wall to another, and every such corridor shall have a door and fire escape at each end thereof.

Every fire escape in such building shall consist of an iron stairway extending from the ground to the topmost story and shall have a landing at each story communicating with such corridors. The treads of such stairway shall be not less than eight inches wide, and the risers shall be not more than seven inches high.

Each such stairway shall have a substantial iron railing at least three feet high on its exposed sides. From the landing at the top story a metal ladder shall extend to the roof, as provided in this ordinance for other fire escapes.

Where any hospital, sanatorium, sanitarium or asylum is built on the pavilion system, consisting of two or more buildings connected by corridors, there shall be fire doors at each end of every corridor connecting such buildings, which said fire doors shall be constructed and arranged in accordance with the provisions of this ordinance.

Provided, however, that the provisions of this section shall not apply to any hospital, sanatorium, sanitarium or asylum constructed, used and occupied as such on the first day of September, 1910.

Architect Weeks Busy

In addition to two large hotels for San Francisco, costing close to $100,000 each, Architect William H. Weeks has an unusually large number of important country jobs under way, including a sanitarium at San Luis Obispo, a summer residence at Santa Cruz for a wealthy Denver capitalist, banks at Tracy and Ferndale, Humboldt county; a schoolhouse at Turlock, a $75,000 addition to the Watsonville Hotel, an auditorium and theater at Watsonville, and a number of residences. Plans for these buildings have either recently been finished or are now being prepared. This work is in addition to many buildings under construction, including a Carnegie library at Livermore and another at Monterey, buildings at Richmond, Newman and Turlock, and a pretentious bank building at Santa Cruz. Mr. Weeks employs one of the largest drafting forces of any architect in San Francisco. He also maintains a branch office at Watsonville.

Burlingame Country Club House

Architects Bakewell and Brown of San Francisco have been commissioned to prepare the plans for the new clubhouse of the Burlingame Country Club, to replace the building partly destroyed by fire some months ago. Architect Willis Polk is chairman of the building committee. The new structure will cost in the neighborhood of $50,000.

Big Concrete Warehouse

Work recently has been started in San Francisco upon the largest reinforced concrete warehouse on the Pacific Coast. It is for the Deere Implement Company, and will occupy an entire block. The building will be four stories and basement, and the Turner mushroom system is to be used for reinforcement. The building was designed by Architect Norman B. Coulter of San Francisco.

Schoolhouse Competition

There is to be a competition for a $50,000 schoolhouse for the Hester school district at San Jose. William Blauer, cashier of the Garden City Bank, is chairman of the board of school trustees, which has the matter in hand.

August Meeting of San Francisco Chapter, A. I. A.

A SPECIAL meeting of the San Francisco Chapter, A. I. A., was held at Tait's, on Thursday evening, August 18. After dinner, the meeting was called to order by the president, Mr. William Mooser.

In the absence of Mr. B. J. Joseph, the secretary reported for the legislative committee, that the committee was still at work on the act of 1872, and was in consultation with the attorney, to have the proposed act constitutionally correct; that the time involved was due to the many points requiring consideration in this direction. A report, in all probability, will be ready at the next meeting.

Mr. Mooser, chairman of the committee on competitions, called on Mr. McDougall, secretary of the committee, to report. Mr. McDougall reported that three competitions had been under consideration during the past month: The Druids' Hall, German House, and the third program issued for the Washington school of Alameda. As to the Washington school, a letter had been sent to the members expressing the attitude of the committee on this competition. The Druids' Hall program was not approved. The program for the German House had not been issued, but it was understood that the association had called on a committee, consisting of an engineer and two contractors, to settle on a program. The committee had had several meetings with the directors of the German House association, but had been unable to get a program for approval. Mr. McDougall took occasion to impress on the members the necessity of adhering to the code by not entering a competition which had not been approved.

During a discussion which followed, it was moved by Mr. Lansburgh, and seconded by Mr. O'Brien, that the chapter condemn any competition which does not comply with the letter and spirit of the program.

Mr. Welsh, for the publicity committee, reported that his remarks at a previous meeting had borne fruit, inasmuch as several extracts, which he had read from the daily papers, went to show the advantage of employing an architect for any building project; one article in particular having been suggested by a contractor, which would show that the architects had some friends among the building fraternity.

The nomination committee, appointed at the previous meeting, and consisting of Messrs. Welsh, O'Brien, MacDonald, Joseph and Bakewell, submitted the following report, which was signed by all of the committee:

San Francisco, August 4, 1910.

The meeting of the nomination committee, appointed by the president of the San Francisco Chapter of the American Institute of Architects, was held at the office of MacDonald & Applegarth, on the afternoon of August 4, 1910. Present: Messrs. Bakewell, O'Brien, Joseph, MacDonald and Welsh.

On motion, Mr. Welsh was made chairman, and Mr. MacDonald, secretary.

The consensus of opinion of those present was that, in view of the good record made by Messrs. Mooser and Schnaittacher, as president and secretary, respectively, for the past term, they should be renominated.

Mr. McDougall was, on motion, nominated for vice-president, and Mr. Curlett and Mr. J. W. Reid, trustees. (Signed as above mentioned.)

On motion of Mr. Ross, duly seconded, the report was adopted, and Messrs. Mooser, McDougall, Schnaittacher, Curlett and J. W. Reid were declared nominated for the offices mentioned in the report.

Mr. W. B. Faville nominated Mr. L. C. Mullgardt for the office of president. The nomination was seconded by Mr. E. A Coxhead.

Mr. Arthur Brown, Jr., nominated Mr. William C. Hays for the office of vice-president. Mr. Hays declined, and nominated Mr. August Headman, which nomination was seconded by Mr. W. B. Faville.

On motion duly made and seconded, the nominations were closed and the names here mentioned were then declared the nominees for the respective offices, to serve for the ensuing year.

Messrs. John A. Baur, Charles Mau, Frederick D. Voorhees, August A. Denke and De Vere V. Deul were elected chapter members.

Communications were received and placed on file: From Glenn Brown, concerning the territory of the chapter; from the New York Chapter, concerning an award for apartment house designs; from Henry A. Schulze, regarding the convention of American Federation of Arts, which he attended as a delegate of the chapter.

Under the head of "Unfinished Business," the secretary was directed to advise Mr. Glenn Brown that the chapter considers that portion of California under the jurisdiction of the State Board of Architecture for the northern district, as its territory; also Oregon, Nevada, and the Territory of Hawaii.

On a motion of Mr. Welsh, duly carried, the resolution was laid on the table.

Mr. Mullgardt read a letter which he had received from Mr. Irving K. Pond, president of the American Institute of Architects, asking that the chapter use every means to augment its institute membership, and that applications now submitted will receive prompt action. He also reported an interview which he had had with Senator Newlands, in which he had suggested that the chapter take action to suggest a site for the proposed Panama-Pacific Exposition. Senator Newlands also suggested that the waterfront would be an appropriate site, and also that an effort should be made that

the principal improvements should be of permanent benefit.

The Exposition committee of the chapter was instructed to arrange for a semi-public meeting in the near future, at a date between August 28th and September 3d, the meeting to be held either at the Palace or Fairmont hotels, and subject to the approval of the Exposition committee.

City Refuses to Inscribe Tharp's Name on Hall of Justice

The San Francisco dailies have made much ado over the action of the Board of Public Works in deciding not to have the name of the late city architect, Newton J. Tharp, appear upon the cornerstone of the new Hall of Justice. The original plan was to inscribe an appropriate tablet in memory of the man who designed the building, and who died while in the employ of the city.

Regarding the board's action, Commissioner Newsom has the following to say:

"We agreed that it was best there should be no personal inscriptions placed on any of the cornerstones. We had to make this rule, for improvement clubs were constantly coming in with suggestions as to neighborhood schools, etc. We might just as well carve the name of the present city architect on the buildings now going up as put that of Mr. Tharp on the cornerstone of the hall.

"I knew Mr. Tharp personally and had a high regard for him. I don't think the mayor had any knowledge of the matter one way or another. He never said anything to me about it. I believe former City Architect Rixford, who was Tharp's brother-in-law, had a stone prepared bearing the latter's name, but I never saw it.

"But it is not customary nor appropriate to have the names of individuals inscribed on public buildings."

In reply to the report that the ashes of Mr. Tharp would be placed in the cornerstone receptacle, Mayor McCarthy is reported as saying:

"As for placing the remains of Mr. Tharp in the cornerstone, the Hall of Justice is not a cemetery."

San Jose Building

Architects Theodore Lenzen & Son of San Jose have prepared plans for a $10,000 building for Observatory Parlor, Native Sons of the Golden West. The building will be two stories and basement, and will contain a hall, dining-room, lodgerooms, etc.

Masonic Temple

Architect John D. Hatch of San Francisco has prepared plans for a $40,000 Masonic Temple for Brooklyn Lodge, No. 225, in East Oakland. The building will be three stories and basement, and the architect has worked out a very attractive exterior in classic lines.

Personal

Henry Jacobs has recently taken possession of an artistic suite of offices in the French Bank building, on Sutter street, San Francisco. Hardwood floors, furnishings of fumed oak with cream-tinted walls, furnish the most distinguishing features of the pretty rooms.

Architect Thornton Fitzhugh, designer of the Pacific Electric building and a number of other prominent structures in Los Angeles, before he went to Phoenix, Arizona, three years ago, to prosecute various public building commissions for the Territorial government, has returned to Los Angeles and has opened a suite of offices at 684 Pacific Electric building. Mr. Fitzhugh's headquarters will in the future be in Los Angeles, although he will continue to maintain his Phoenix office under the management of his brother, Lee Fitzhugh.

Architect Francis W. Wilson has closed his office at 1104 Kerckhoff building, Los Angeles, and has removed to Santa Barbara, where he has opened an office at 717½ State street. Mr. Wilson was formerly located in Santa Barbara.

Architect U. O. Long, who was for some time located in Los Angeles, is now associated with Architect J. M. Saffell, in suite 16-17, New Fish block, Bakersfield, the firm now being Saffel & Long.

Bliss & Faville Busy

While some of the San Francisco architects have been letting out their draftsmen during the present lull in new work, Messrs. Bliss and Faville have been adding to their force to turn out the new work that is continually coming in. The firm recently has been commissioned to prepare plans for a building for the London, Liverpool and Globe Insurance Company, to cost about $150,000. It will be erected on California street. The same firm is finishing the working drawings for a Masonic temple that will cost more than half a million dollars; also the Banker's hotel in Oakland and the reconstruction of the Rialto building, at New Montgomery and Mission streets, San Francisco.

Oakland Architects Organize

The recently organized Oakland Architects Association is to affiliate with the American Institute of Architects, and the object is to do more effectual work for the revision of building laws, both in Oakland and in the State. The officers are: Louis A. Stone, president; J. C. Newsom, vice-president, and W. J. Wright, secretary. Standing committees were appointed to be: On publicity, C. W. McCall and S. B. Newsom; by-laws, W. J. Wright and D. V. Deuel; building laws, L. S. Stone and J. C. Newsom.

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Educational Centers for School Children

Everywhere are schools crowded. In the large cities they have perforce to be built up four, five and more stories, and the value of property is increasing so that the playgrounds are becoming more and more microscopic in extent. It is flattering and agreeable to note that it is an architect who has offered a sensible way out of the dilemma. Dwight Perkins of Chicago calls our attention to the fact that it isn't at all necessary to bring our schools to the children simply because we have always done so.

In these days of rapid transit it would be just as easy and far saner to build our schools well out of town, educational villages with centralized management, splendid playgrounds, good air and the light of all outdoors. The cost would be infinitely less than that of city schools. Then provide school cars from every district of the city to that educational center. Instead of being at school at a certain hour it would merely be up to the "kids" to be at a certain corner at a prescribed hour to get on their special car. The thing may seem visionary now, but it's logical, full of splendid possibilities and is what we will be doing before many years.

Licensing Architects in Louisiana

The State of Louisiana has recently enacted a law, similar in many respects to the California law, providing for the licensing of all architects. The act provides that all persons wishing to engage in the practice of architecture in the State, excepting those now practicing architecture, must apply to a board of architectural examiners for a certificate showing their fitness to practice their profession. They can obtain the right to practice by showing either a diploma from a recognized college of architecture, or by passing an examination in architectural engineering, architectural de-

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signing and architectural history. The applicant must be at least 21 years of age, and must possess a good moral character. The members of the board of examiners are to consist of five architects, all of whom must have practiced for at least ten years. It is provided that two members of the board may grant a temporary permit to practice, but they must report this to the next regular meeting of the board. The clerk of the court is entitled to a fee of $1 for the registration, and every year the architect must pay a fee of $5 to the board, and in case of his failure to do so his name will be taken off the roll of the clerk of the court, and he will not be permitted to practice, and should the fee be paid after January it will be $10, instead of $5. Every April the board is to publish a list of the registered architects, together with their residences, in a daily paper published in New Orleans. The members of the board are to be appointed by the Governor, and they are to be entitled to $5 a day during the sessions of the board, and their traveling expenses. They are empowered to charge $10 for an examination, and in case the applicant fails they are entitled to retain $5 of this amount. The act further provides that the failure of any one practicing architecture to comply with the provisions of the act shall subject him to a fine of not less than $25 and not more than $100, and he shall be imprisoned not less than 30 days nor more than 90 days for each offense.

INCREASE IN WAGES AND DECREASE IN EFFICIENCY OF LABOR.

THE following letter, written by the "General Contractors" of Minnesota, and published in Engineering and Contracting, throws some light on present labor and wage conditions in the Middle West, and substantiates the common impression that better wages among certain classes of workers does not insure higher grade work:

"With reference to the cost of labor at the present time compared with 1905, and for particulars as to the efficiency of labor today as compared with the earlier date, and something as to the cost of boarding men and horses at the present time as compared with five years ago, we have made some investigation, but are not yet in position to give all the facts. * * *

"Taking work which this company is doing in the northern part of Minnesota stripping mines, comparing this year with 1905, there has been no increase in the actual wages paid donkey engineers, blacksmiths and helpers, teamsters, cooks, powder men, shanty bosses and a few others. We are paying the same wages to a master mechanic now as at that time, an advance of 25 to 50 cents per day for blacksmiths, and about the same for blocksmith helpers; 25 cents per day more for carpenters, car repairers and firemen; 10 to 20 cents per day more for drillers; from 10 to 35 cents per day more for brakemen; from 10 to 35 cents per day more for labor; in some cases—25 cents per day more for dump foremen; 10 to 35 cents per day more for switchmen; 50 cents more per day for oil men; 10 to 35 cents per day more for pit men; wages of steam shovel engineers have gone up about 20 per cent, and of cranesmen about 16 per cent.

"It is a little difficult to be certain about this from our records, as there is a variation of rate paid sometimes, due to the real efficiency of men occupying the same position, or the same position so far as the payroll indicates it. As a matter of fact, on this work of which we speak there is paid something like 10 per cent in the way of bonuses to men who are particularly efficient, or who remain throughout the season and perform satisfactory service. This is a premium which we give for the purpose of retaining men throughout the season, as we consider that generally their efficiency and worth increases with the length of their service.

"As to the general efficiency of labor as compared with five years ago, while it is pretty difficult to secure any basis of exact comparison, or determine upon percentage of decrease, it is the general observation that there has been, generally speaking, a decrease in the efficiency of labor during the time named. It would be difficult to assign a reason for this. It is doubtless due to many causes. It is the common observation and opinion in contract work that efficiency decreases, generally, with an abundance of work and with higher wages. To put it plainly, when there is an abundance of work and wages are higher men are scarce, and there are plenty of jobs. They are indifferent, or sometimes are inclined to be, and care little about retaining their jobs, for the reason that they can so easily and so quickly find others. When work is scarce and wages consequently lower, a man will do better work in order to hold his job, as he may not easily be able to secure another one.

"Another reason may be that the character of common labor, particularly, has

changed and is changing. The more ambitious, industrious, efficient workers from the north of Europe have given way to those from the south who are less energetic, and man for man generally physically inferior. All this is a matter of general observation and conjecture.

"The price of all foodstuffs has generally advanced very materially in the past five years, and cost of boarding men consequently is greater, so that where men receive board as part of their compensation, they receive more, or the contractors at least pay more, although the stated rate per day or month may remain the same. The cost of horses and mules, as well as their feed, has also materially advanced."

Los Angeles Architectural Club

A "Booster" meeting was held recently by the Los Angeles Architectural Club at the clubrooms in the Union Trust building. It was entirely of a social nature, and the entertainment committee furnished an interesting program. There were vocal, piano and violin solos, and a short but interesting address by Florian Peixotto, a famous European artist. The tables were handsomely decorated and a Dutch lunch was served.

That the club is meeting with the heartiest support by those interested in the profession is evidenced by the fact that there were eighty-five in attendance, and several applications for membership were received.

One of the principal objects of the club is the organization of classes for instruction in various lines as an aid and help to the younger men. The classes are open to any one, and there are no fees attached, each individual paying his own expenses. A class for the study of water color has already been formed under the supervision of John T. Vawter, and will undoubtedly be very interesting and of great benefit to those taking advantage of this opportunity.

Two additional classes will soon be started for study from life and steel and concrete design and construction. These classes will be in charge of competent men, and will be particularly interesting to those interested in these lines and will create additional interest in the good work being done by the club.

Merchants' Association After School Contractors

The San Francisco Merchants' Association has issued another report charging the city inspectors employed by the bureau of engineering and architecture under the Board of Public Works with having neglected their work and allowed contractors to cheat the city by the substitution of cheap and worthless material.

Henry A. Campbell, engineer in charge of the Merchants' Association work, has this to say of conditions:

"In general, the inspection of work on public buildings has been grossly neglected by the inspectors, the city getting only what the contractors' superintendents are pleased to give in the way of quality, workmanship and materials. In some cases inspectors have been absent from the work while concreting was going on."

According to Campbell, the laxity of the inspectors has caused the use of weakened concrete in many of the public buildings. City inspection on the Sheridan and Denman schools, he declared, was a farce. At the Sheridan school after the Board of Public Works had made the final payment of $30,000, defective work was uncovered in nearly a score of places. By substituting inferior roofing the contractors, Hanning & Burke, saved $1,000. The board withdrew its final payment.

In many of the schools, said Campbell, no tests were made by the inspectors, and the contractors used material palpably weak and below the required strength.

Henning & Burke hold the contracts for the Sheridan and Denman schools; Caldwell & Co., the Spring Valley school, and Robert Trost, the Frank J. McCoppin school.

Honor for Californian.

The Associated Press is responsible for the following dispatch from Chicago:

"Theodore Laist is not registered in Illinois as an architect, but is the only man available for appointment as city architect. The city civil service commission is in consequence facing the difficulty of extricating itself from a predicament caused by its method of conducting the examination for the position.

"When the examination was held the local residence of the candidates was waived. Laist came from California about six months ago. Residence of a year is necessary. Laist was first in the list with an average of 89.36."

Architects Show Work at Sacramento

In connection with its exhibit at the Sacramento State Fair, the Oakland Chamber of Commerce called on the following architects for reproductions of work done by them during the past year: Palmer & Hornbostel, Fred Soderberg, McCall & Wythe, Clay N. Burrell and Walter Mathews.

Goes to Honolulu

Frank Farenkopf, head draftsman for Architect Washington Miller for a number of years, has gone to Honolulu, where he has taken up the practice of his profession.

HEATING AND LIGHTING

Plumbing and Electrical Work

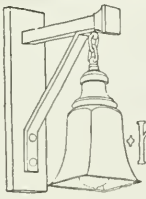
Heating a Shop Through the Floors

NO steam or hot water, no heating coils, no hot air registers—the absence of these devices for heating a shop is the engineering feature of a modern industrial plant, reported in the American Machinist. The exterior walls of the buildings of this plant are either of concrete blocks or monolithic concrete, in which the aggregate is crushed stone, a native slate quarried on the spot in preparing the foundations.

A system of 1-inch wrought iron pipe was laid in the floor of the new pattern shop and connected back to the drip from the glue pot by a suitable system of valves. This system was put in with two ideas. A section of heated floor space would be of service in drying out the built-up wheel pattern sections after they had been glued; at the same time, it was believed that the arrangement would serve as a satisfactory way to heat the shop. This shop was a roofed-over court between two main buildings. Aside from the heat which would be communicated to the floors from the system of pipes, no other provision was made for heating the room, except to make a few openings whereby air from the plenum of the main shop could enter. This experiment was successful.

The new plant which this same concern has recently erected has offered the opportunity for a trial of this novel system of heating an industrial plant on a scale large enough to grasp its real worth. Three modifications of this system of heating through the floors are in use in the new plant. The pattern shop is heated by exhaust steam traversing wrought iron pipes laid in the concrete floor. The main machine shop is heated by hot air, forced through a system of supply and return ducts built in as a part of the concrete floor structure, and the blacksmith shop is heated by a circulation of hot flue gases through a system of tile pipe buried some little distance below the floor of the shop. The pattern shop system is that of the simplest installation and more directly follows the successful experimental system at the old plant.

The pattern shop building is some 80 feet long, 22 feet 8 inches wide, and has a cubical content of 32,250 cubic feet. The walls are of monolithic concrete; the roof is of 3-inch plank, covered with composition roofing, and the building is isolated, except for the southern end, where it joins a lumber storage and a pattern storage building. Along the western wall is a 3-inch exhaust steam supply main; 1-inch pipes tap from this main run across the building, turn and run parallel with its length for a distance of about 5 feet, then turn again, cross



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the building again and enter a 2-inch return main that runs the length of the building on the same side as the supply main. The 3-inch supply main is at a level of about 1 foot above the floor. The total amount of radiating surface is 310 square feet, distributed as follows: Eighteen 1-inch pipes, 28 feet long, 161.4 square feet of surface; nine 1-inch pipes, 5 feet long, 15.5 square feet of surface; one 3-inch pipe, 84 feet long, 80 square feet of surface; one 2-inch pipe, 84 feet long, 52.5 square feet of surface, giving a total of 309.4 or, say, 310 square feet of radiating surface.

How to Insure Good Lighting

The National Electric Lamp Association gives seven rules for good illumination which are applicable to almost every phase of electric lighting.

Following are the seven conditions to be observed to insure good lighting effects as set forth in the bulletin:

"Illumination must be acceptable to the eye. We should be able to see objects clearly and with a minimum of fatigue. To accomplish this result, certain conditions must be fulfilled.

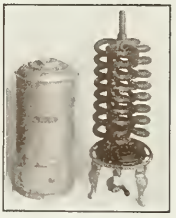
"(1) There must be sufficient illumination. Since objects are seen by means of the light which they reflect, more light must be thrown on dark objects than on light ones.

"(2) There must not be too much illumination. Too strong a light tires the eye, partly due to the muscular effort of contracting the iris, and partly because of the strong light reaching the sensitive retina.

"(3) Intensely bright lights in the field of vision should be avoided. The iris closes somewhat in order to accord a protection from such lights and the amount of light received from illuminated objects is thereby so reduced that they cannot be seen clearly. This accounts for the well-known dazzling effects of searchlights and of many headlights. The intrinsic brilliancy or candlepower per square inch of luminous area should therefore be kept as low as possible; it should not ordinarily be higher than 4 to 6, if the source of light is in the field of vision.

"(4) Flickering lights should be avoided. Poorly regulated circuits, such as those having varying power loads, cause disagreeable flickering. However, the metal filament lamps have an inherently better regulation than the carbon filament lamps; a change of 3 volts on a "Mazda" lamp alters the candle-power no more than 2 volts on a carbon lamp.

"(5) Lamps should be so placed that the light is not regularly reflected into the eye. A desk lamp should be placed to one side rather than directly in front of the person using it to avoid the glare from the surface of the paper. Smooth reflecting surfaces on the desk, such as plate glass, etc., are undesirable from this standpoint.



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"(6) Streaks or striations in the illumination are undesirable. Arc lights with clear globes show this phenomena. Open reflectors having smooth interior surfaces should be used only with frosted lamps.

"(7) A satisfactory light must be of a proper quality. It should have a continuous spectrum, i. e., one containing every color, in order that the relative color values of objects illuminated may be the same as when seen by daylight. For matching delicate tints, as in silk and paper mills, the light should be as white as possible, while for general illuminating purposes a 'warm' light is best; cold, glaring lights, too rich in green and blue, are to be avoided."

Gas Water Heaters

To the Editor of the Architect and Engineer:

We are writing to compliment you on your care in writing the article headed "Imperfect Gas Water Heaters Cause Death."

We compliment you on sticking to facts in the article, but you are open to censure in the heading, which reads "Imperfect Gas Water Heaters Cause Death." We wish to protest against that, not only on our own account, but on account of our competitors. More deaths have been caused by carelessness of our competitors in advocating vent pipe, than by our own goods. The fault, however, is not in imperfect water heaters, but in what you say in your article, improper installation.

The fumes given off by gas water heaters contain carbon monoxide, a deadly poison. Gas water heaters are generally installed in small and poorly ventilated rooms, so that, while gas heaters are in operation the air in the room is vitiated by the life-sustaining properties taken out of it to make the flames burn, and is furthermore poisoned by the contents of the fumes, or burned gases given off, so that it is very essential that gas heaters be connected with a vent pipe.

It may be of interest to you to know that in Chicago, Ill., an ordinance is in effect that is now about a year old, that gas water heaters shall not be used without a vent pipe. The same thing refers to Los Angeles, where the present ordinance has been in effect some three or four years. An even more comprehensive ordinance is in existence in Cleveland, Ohio. It prohibits the use of gas appliances of any kind, that burn more than ten cubic feet of gas per hour, without a vent pipe. Yours truly,

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Jenisero Trim for Portland Skyscraper

The Dieckmann Hardwood Company of San Francisco, is furnishing the Jenisero trim for the new Yeon building at Portland. This is the first building in Portland to be finished throughout with this trim. The San Francisco company states that the architects, Reid Bros., selected it in competition with others because of its attractive features.

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Plumber's Interesting Discovery

The Toronto Star in a recent editorial has the following to say under the heading of "Faulty Construction":

"From time to time the press has sounded an alarm with regard to hastily constructed homes. It has been pointed out that Toronto builders have been guilty of 'rushing up' their houses, installing flimsy floors and 'skimping' their work in many ways. The result is seen in residences only a few years old, where the plaster is falling from the walls, the woodwork shrinking and out of shape, the roofs leaking and the floors becoming uneven. Because the city architect's department has no right to interfere so long as the foundations and walls are strong, these matters would be difficult of regulation, even had the already overworked staff of inspectors the leisure to attend to them.

"Plumbing, however, involves the public health, and there seems to be no reason why the requirements with regard to it should not be enforced. The Plumber and Steamfitter believes they are not, and cites the following instance:

"'A man rented a house and store on Royce avenue. He happened to be a plumber, and on taking possession naturally took a look at the plumbing in his new home. Here is what he found: The hot water pipe from the top of the range boiler was left hanging in the partition, while the pipe from the hot water tap in the sink was connected to the cold water tap in the adjoining house. The cold water pipe connected with the tap in the sink was found with an open tee in the partition behind the baseboard. All bathroom fixtures leaked, owing to loose couplings. The gas pipe was not carried to the meter, being left hidden in the partition.'

"He may consider himself lucky that his gas meter was not connected with the water pipes. He was fortunate in being a renter and not a buyer. Toronto's rapid expansion is a source of civic pride, but it brings with it the temptation to build hastily rather than well."

The Longevity of Tungsten Lamps

In the London Electrical Times is given an account of some extraordinary long-life performances of tungsten lamps. While it is known that in many instances tungsten lamps have exceeded their rated life by over 50 per cent, the publication states that it is quite common for them to have a life of over 3,000 hours, and several instances are known of them having achieved from 5,000 to 10,000 hours. One case in particular is cited of a 100-candlepower Osram lamp that burned continuously for 15,643 hours, with only a moderate diminution of candlepower till the end. Whether this lamp was burned at normal voltage or below this it would be interesting to know positively. However, if such a long life, or even one one-third as long, became common and could be maintained at close to rated efficiency, the tungsten lamp would quickly sweep all competitors from the field and hold practically undisputed sway.

San Francisco Master Steamfitters Organize

The master steamfitters of San Francisco have organized under the name of the Master Steamfitters Association of San Francisco. The officers are: President, F. W. Howard; vice-president, E. B. Lennig; secretary and treasurer, R. P. Lindsay. The charter members of the organization are: R. Dalziel, Jr., Company, Lennig-Rapple Company, Wittman-Lyman Company, Mangrum & Otter, H. W. Moffatt, J. G. Sutton Company, Turner Company, Pacific Fire Extinguisher Company, M. Levy Plumbing and Heating Company, Tim Collins, Royal Heating Company, J. E. O'Mara and Gilley Schmidt Company. The members of the association plan to join the National Association of Master Steam and Hot Water Fitters in a body, as well as individually.

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American Society of Engineer Draftsmen

The American Society of Engineer Draftsmen, embracing every branch of the profession, including mechanical, electrical, civil, architectural, marine, sanitary, automobile and aeronautical draftsmen, has been permanently organized in New York. The first meeting of the society was held on July 27th. The formation of this organization, which was conceived by E. Farrington Chandler, a well known designer and inventor, marks the first effort to form a national society among draftsmen.

Draftsmen have long felt the need of an organization, both from an engineering and a fraternal standpoint, which would be the means to establish a higher professional standing and place them on a recognized professional plane, in the field of engineering.

The benefits of an organization of this character are well understood and need no elaboration. A decided feature of the society is the opportunity offered juniors, affording means by which they may become familiar with the demands of practice, in the drafting room, while students or employees in other branches of industrial work, as is also an employment bureau co-operating with employers.

The qualifications for membership are such that a standard will be established, as in other branches of engineering, and it is the aim of the society to maintain this standard, and to secure recognition from every concern employing draftsmen.

The officers chosen are E. Farrington Chandler, president; William B. Harsel, vice-president, and Henry L. Sloan, secretary and treasurer, with headquarters at 116 Nassau street, New York.

A Primer of Architectural Drawing

A Primer of Architectural Drawing is the name of a work gotten up especially for a textbook in schools where elementary drawing is taught. The volume consists of a progressive series of drawing board problems, and is published by the William T. Comstock Company, 23 Warren street, New York. The book is intensely practical in that theory is obliterated by the author's system of construction on paper. The author has arranged the matter most interestingly and has presented all the principal elements of architectural structural drawing much more concisely than any similar work heretofore published. There are twenty-five problems, each illustrated by a plate, accompanied with 161 explanatory detail figures. There are 154 pages, and the price of the book is $1.25.

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By the Way

Some Industrial Information Worth the While

Liquid-Stone—a Damp Proofing

The Liquid-Stone Company is having splendid success in marketing its damp-proof coating, and reports that many architects and contractors have used the fluid as a substitute for more expensive materials. The company, in its circular, gives a good many reasons why Liquid-Stone deserves recognition. Here are some of them:

"Liquid-Stone is a paint made from stone and applied with an ordinary paint brush.

"Liquid-Stone contains no oils, benzine or turpentine.

"Liquid-Stone can be successfully used for damp-proofing brick or concrete walls.

"Liquid-Stone can be used as a preservative for piles or any submerged wooden structure, the stone surface being impervious to the action of limnoria or teredo.

"Liquid-Stone applied to piles by our process will not flake off when driving.

"Liquid-Stone will not deteriorate when exposed to the atmosphere, under water or under ground, but hardens into a steel-like consistency with age.

"One coat of Liquid-Stone is all that is necessary to cover any surface.

"Liquid-Stone can be used to coat railroad ties, telephone and telegraph poles.

"Liquid-Stone is positively a sanitary product, and germ proof.

"Liquid-Stone should be mixed and applied strictly according to directions.

"Liquid-Stone will set and dry hard in six hours, with the temperature 60 degrees."

The company's main office is in the Chronicle building, San Francisco.

Enlarge the Scope of Their Veneered Panel Department

The big hardwood house of White Bros., which has lately changed its location from Spear and Howard to Fifth and Brannan streets, San Francisco, has just enlarged its panel department and increased its facilities for handling this class of goods. For the last few months White Brothers have been receiving numbers of carloads of panels; in fact, they have taken a good part of the output of one of the largest panel factories in the country. In this way they are able to quote some very interesting prices on panels. Their stock at the present time is enormous and complete, and comprises a wide range of materials, being especially strong in the more moderately priced panels, such as ¼-inch elm, birch, maple, plain and quarter sawed oak, etc.

Ceresit Waterproofing Specified

Ceresit Waterproofing compound, sold by Parrott & Co., San Francisco, Los Angeles, Portland and Seattle, has been specified by Architect E. A. Neumarkel for the concrete foundations and swimming tank in the new Turnverein building for the San Francisco Turn Hall Society.

J. J. Moore Building, San Francisco
Hladik & Thayer :: :: :: Architects

THIS CUT shows the new MOORE BUILDING on Post Street above Taylor, San Francisco. ¶ This building is faced with red pressed brick and "GOLDEN GATE SANDSTONE" BRICK made at our Antioch factory. ¶ You know the Golden Gate Brick Co. are also interested in a clay pressed brick plant at Stockton, where they make all kinds of clay pressed brick, white enamel, mat glazed and fire brick. ¶ They ship sand not only from their Antioch sand pit but also from pits in the Sacramento as well as the San Joaquin Valley. ¶ Better see Golden Gate Brick Company for samples and prices :: :: :: :: ::

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Vigorite Hydrate Lime for Waterproofing

The Holmes Lime Company of San Francisco is finding an ever-increasing market for Vigorite hydrated lime, which has been found to be without an equal as a waterproofing material when properly mixed with good Portland cement, sand and rock.

Hydrated lime is prepared from quick lime by slaking it with sufficient water to change each particle of quick lime into the hydrate. When the slaking is properly carried out the product is a fine, dry, white powder containing no free or unslaked lime. It is chemically the same material as lime paste without the excess water to render it wet. The hydrate should be prepared at a plant designed for the purpose, with special machinery and under the supervision of competent men. The material is at present prepared by a number of lime manufacturers and placed on the market in bags, in much the same way as cement. The hydrate as produced by the manufacturer is much more uniform than can be prepared by slaking lime on the work. It must not be confounded with air-slaked lime, which is a different material and not suited for use in concrete. Air-slaked lime is lime which has been acted upon by the moisture and carbon dioxide of the atmosphere until it has been broken down into a powder; this powder consists of hydrate of lime, carbonate of lime and free caustic lime; it is not, therefore, a homogeneous product, nor one suited for purposes of construction.

The following letter addressed to the Holmes Lime Company, from the Miller and Lux Company, is proof of the high value of hydrated lime for waterproofing purposes:

"In reply to your letter of the 16th instant, in regard to the tank which I constructed, will say that I specified the following proportions: 10 per cent "Vigorite" brand hydrated lime, 90 per cent Portland cement, two parts sand, and four parts rock.

"The tank is eight feet square, six feet high and eight inches thick. It is built on a salt water marsh four feet below tidewater. The purpose of the tank is to receive the water from an artesian well, which is pumped into a 40,000-gallon tank to be used for boiler purposes, etc., around our packing house, and therefore must be absolutely free from salt water.

"The tank has now been constructed some two or three months, and there is absolutely no seepage or leakage of any kind. This fact is more commendable when I say that the concrete mass had but two hours to set between change of tide, the tank being entirely surrounded by salt water at high tide.

"After the above experiment, I am perfectly satisfied that with the proper proportions of 'Vigorite' brand hydrated lime, together with Portland cement, sand and rock, an absolutely waterproof concrete mass is a certainty. I will be

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pleased to furnish you any further data you may require. Yours very truly,

"(Signed): F. O. CLAWSON,
"Consulting Engineer."

Popularity of the Gravity System for Pouring Concrete

Architects and contractors from one end of the coast to the other are manifesting great interest in the new gravity system for pouring green concrete, described in this magazine some months ago. Those who have used the system say they cannot do without it now. It is a valuable time-saver, as well as a money-maker. It does the work of many men. The system is particularly adapted to concrete work covering considerable ground space. A contract recently has been secured by Parrott & Co., from Contractor Arthur P. Bent, for the use of the system in the construction of the Sweetwater Dairy, in San Diego county. Some 20,000 yards of concrete will be placed by the use of this system. It is believed that eventually all important concrete work will be poured by the gravity method.

Studying Concrete Methods

The advancement made in reinforced concrete design, construction, and construction methods in California has attracted the attention of the engineering profession in all parts of the world. T. L. Schubert, a structural engineer of the Royal Technological University of Stockholm, Sweden, is visiting the Coast cities for the purpose of studying structural methods in vogue here, and especially to learn more about the gravity system of handling concrete. The gravity system originated in Los Angeles and has been a great factor in structural methods throughout the country, where it is rapidly being adopted. Mr. Schubert declares that this portion of the United States has a world-wide reputation in reinforced concrete construction and is being watched for advanced methods in this line of building.

The Latest in Heating Apparatus

Not content with the remarkable success achieved with the Queen Gas Heater and the Hart Combination Hot Water Boiler, the Hart Heater Company has extended its field of usefulness, and is now prepared to install a complete house-heating service, by the use of hot water radiators, at the same time providing hot water for every household use.

The radiator system which has been set up, for demonstrative purposes, at the company's office, 406 Thirteenth street, Oakland, Cal., is a most convincing proof of the efficiency of the new system, and of its economy in fuel and in time. The officers of the company are pleased to demonstrate, to interested parties, the advantages, economic and sanitary, of the new system.

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Work on the Banker's Hotel

The Locke Foundation Company has the foundation work on the new Banker's hotel, in Oakland, well along, and the company is doing a first-class job. The hotel will be seven stories in height, of early Californian architecture modified to modern usages and equipments. The materials are to be steel and concrete, with concrete walls and tile roof. Some $13,000 will be expended in structural and decorative marble, while the ornamental iron will cost nearly $17,000. The woodwork, most of which will be from California forests, will represent a value of $40,000. Contracts to the extent of $585,000 have been let up to date, insuring the installation of every device and convenience known to the modern hotel world. The complete structure will cost not much less than $870,000, and $300,000 will be expended on the furnishings. The plans and specifications call for nearly a thousand rooms, 300 of which will be en suite.

Plumber Levy Has His Troubles

A contractor in the plumbing line presented a bid to the San Francisco Playgrounds Commission to do certain work at the North Beach playgrounds, but after it was accepted discovered that it was nearly a half less than those of other bidders and at once brought the telephone into play to say that he had bid for only part of the work, but this did not avail him, for the commission declared that he must do the work or forfeit his check amounting to $59.80.

The contract was awarded to M. Levy to install lavatories in the girls' section of the North Beach playground for $598, as against $975 and $800 by two other bidders. Subsequently Levy notified the commission that his bid is only for the plumbing.

"This looks as if Levy wants to back out now that he discovered that his bid is so much lower than that of the others," said one of the commissioners.

It was stated that Levy had bid according to the advertisement which accompanied the bid, and that if he did not want to carry out his bid the commission would forfeit his certified check.

Christian Science Church

The First Church of Christ, Scientist, will erect a splendid edifice in San Francisco from plans, which have been finally approved, by Architect Edgar Mathews. The building will be an ornament to the city, and will represent an expenditure of close to $300,000.

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Follansbee Brothers Company Enters Local Market

It is noted with much interest by architects and sheet metal workers that the Follansbee Brothers Company of Pittsburg, Pa., manufacturers of high-grade roofing tin, have established a San Francisco branch, and are carrying in that city a large stock of their branded plates. There is a decided growing inclination on the part of San Francisco people to favor the use of good tin, due, no doubt, to the unsatisfactory showing the various substitutes are making. Cheap tin made on Bessemer steel is no more durable than many other forms of roofing, a fact not always appreciated by architects and owners. Good tin plate differs from common tin as much as selected hardwoods differ from box shooks, and failure to recognize this fact has resulted unsatisfactorily for all concerned.

The Follansbee Brothers Company are probably the largest manufacturers of high-grade roofing tin in the country, and they are the only ones now making tin plate in the same way and of the same materials as used by the Welsh in the old importing days, the hammered open-hearth base, formerly known as "ingot iron," being the most important feature. Their mills are located in the Pittsburg district at Follansbee, West Virginia, where they manufacture tin plate and roofing plate from the ore and pig metals to the finished sheet, and they are therefore not dependent on other manufacturers for the quality of any of their materials.

The principal difference in the Follansbee Brothers Company's brands and those of other manufacturers is largely in the base plate used. Not a pound of Bessemer steel goes in or out of their factory, as they use only the hammered open-hearth base in the manufacture of all of their brands. This method guarantees the ingot and the resulting black plate of being low in phosphorus and sulphur, the two detrimental elements found in steel. Furthermore, they hammer the ingots to billets, which process insures the soundness of the latter, it being impossible to have "blow holes" or piping, which are so frequent when the ingots are only rolled.

Their principal brand, the "Scott's Extra Coated," which has been on the market for more than twenty-five years, is the only plate favorably known in the old jobbing and importing days of which the standard has been fully maintained.

(Concluded, second column Page 118.)

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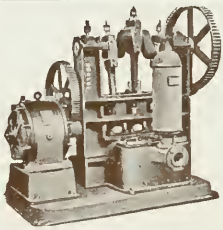

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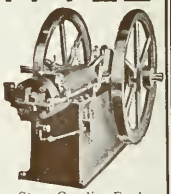

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Halstead Building, San Francisco
Faced with Stockton White Enamel Brick *Arthur J. Laib, Designer*

Business Good With Golden Gate Brick Company

To the energetic management of T. C. Pratt is attributed the constantly increasing volume of business of the Golden Gate Brick Company of San Francisco. In addition to Golden Gate sand-lime brick, manufactured at Antioch, the company is now handling a number of other excellent lines, including Stockton face and enamel brick, Hartford Faience tile, common red and fire brick, terra cotta flue lining, hydrate lime, white Medusa Portland cement and sand, rock and gravel. The company has excellent facilities for delivering the latter in carload lots to any point in the San Joaquin valley.

The accompanying illustration shows the Halstead Undertaking establishment, under construction on Sutter, near Larkin street, San Francisco, and which is faced with Stockton white enamel brick. This building, when completed, will have cost its owners close to $45,000. It is considered one of the most complete and up-to-date structures of its kind on the Pacific Coast. The plans were made by Arthur J. Laib.

Other buildings for which the Golden Gate Brick Company is supplying materials are the Wilson hotel, on Post street; bank buildings in Colusa and Turlock, five section houses in Arizona, and the new Southern Pacific depot at Tulare, designed by Architect D. J. Patterson.

Follansbee Bros. Company Enters Local Field

(Continued from Page 115.)

This brand is made without regard to cost, quality being the only feature considered. There is no reason to put a limit on the life of "Scott's Extra Coated," as when properly applied it can be expected to last as long as the building stands.

One of the most recent large jobs on which this celebrated brand was used, is the Haynes garage, at the corner of Turk street and Van Ness avenue, San Francisco; Cunningham & Politeo, architects. It makes a roof that is light, clean, sightly, fireproof and, above all, more durable than any other form of roofing.

The Follansbee Brothers Company's San Francisco office is at 24 California street, in charge of George S. Lacy.

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The Mess-Nicholson Company

A recent issue of the San Francisco Chronicle contained the following:

Lorenz L. Mess, engineer and formerly partner in the firm of Mess-Nicholson Company, architects and constructing engineers, with offices in the Pacific building, San Francisco, left for an ostensible vacation in the Yosemite on July 31st. With him he took the firm's automobile and some $10,000 belonging to the company. Lorenz L. Mess, the automobile and the money are still away from San Francisco. Neither one of the three has been seen near the Yosemite valley, according to a statement made by Nicholson.

The Mess-Nicholson Company have a contract with F. A. Meyer, of Petaluma, to construct a six-story apartment house on Eddy street, a few doors west of Larkin. The subcontract for the concrete and wood work was let to the Esterly Construction Company of Berkeley, and the wall-bed, plumbing, heating and electrical work to the Turner Wall Bed Company.

On July 30th a payment of $10,000 was due to the firm from Meyer. Payments from the firm to the subcontractors were not due till some ten days later. Mess and Nicholson had dissolved partnership, but still continued a partnership bank account until such time as the Eddy street contract should be finished and paid for.

Mess received three checks from Meyer amounting to $10,000. These he did not pay into the partnership bank account, but indorsed and deposited in another bank on his personal account. The next day he left on his vacation.

No suspicion was aroused until payments to the subcontractor became due. Then Nicholson states that he found for the first time that Meyer had paid Mess the amounts due the firm. Further investigation, he says, showed that Mess had withdrawn the money and that he had not been near the Yosemite valley.

In order to save themselves and other sub-contractors and to prevent further loss of time and money to Mr. Meyer, the Esterly Construction Company assumed the contracts for the completion of the entire building, and have since that time been pushing the work as rapidly as possible.

The money loss has been made up by Mr. Meyer, the Surety Company and Mr. Nicholson, the remaining partner.

So far as known, the automobile party has not been heard from excepting by a postal card dated Stockton, in which it was stated that the roads were very rough and that they would probably be delayed returning.

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Waterproofing

Those interested in the subject of waterproofing will do well to write to the K. C. T. Waterproofing Company of Los Angeles, or their agents, regarding the Imperial waterproofing which is being so successfully used under the most exacting conditions.

Thorough and exhaustive tests by architects and engineers have demonstrated its efficiency and adaptability to any demand a waterproofing might be called upon to meet. The results obtained on the tunnel to the elevators at the court house in Los Angeles have been most gratifying. The basement of the Chamber of Commerce at San Bernardino, after several unsuccessful attempts to waterproof, was finally treated with Imperial waterproofing by the A. F. George Company of Los Angeles with such satisfactory results that it is now being occupied by a drug store. The K. C. T. compound is being used on the large siphon of the Los Angeles aqueduct, the Higgins building in Los Angeles and the Raleigh Hotel in Seattle, Wash.

Imperial waterproofing is a liquid, can be mixed in with the cement or applied to the surface with a brush. It can be applied to brick, cement, plaster, tiling, stone, etc. It contains no oil or grease of any kind, but is a mineral product and practically indestructible. It does not discolor the material to which it is applied and by the use of pigments may be made any color desired. It penetrates the material to which it is applied, filling the pores and protecting it for all time against the deleterious effects of moisture and in the case of buildings renders them more comfortable and healthful for the occupants.

Imperial waterproofing may be obtained from the A. F. George Company, 265 South Los Angeles street, Los Angeles, sole distributors for the Southwest; Baker Bros., San Francisco, and B. W. Gaisford, 446 New York building, Seattle, Wash.

Has Plans for Two Banks

Among the architects who are doing a great deal of out-of-town work is Bernard Joseph, First National Bank building, San Francisco. Mr. Joseph is at present preparing plans for a couple of bank buildings in the San Joaquin valley, one to be erected in Modesto, while the other will be located in one of the nearby towns. The former is to be built by a group of Eastern capitalists. The same architect is also preparing plans for an apartment house.

Fine Hospital for Stockton

Architect Walter King is preparing plans for a modern hospital for the San Joaquin County Hospital Association, to be erected in the Slough City, at an estimated cost of $100,000. There will be eight different buildings, joined into one large structure by courts. The style of architecture will be Mission, and the construction will be brick with exterior treatment of Medusa cement, and tile roof. The same architect has completed plans for a $35,000 church for the First Presbyterians of Modesto. A feature of this structure will be an annex containing a gymnasium, swimming tank, etc., for the young people of the church.

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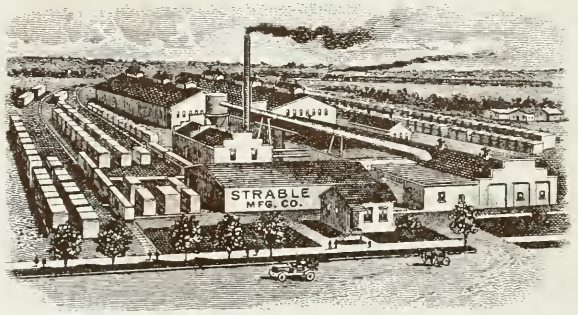
When writing to Advertisers mention this Magazine

Pacific Coast Warehouse of Strable Manufacturing Company

Strable Manufacturing Company Fills Many Hardwood Contracts

SINCE the establishment of its Coast branch, the Strable Manufacturing Company of Saginaw, Mich., has supplied hardwood for many of the most prominent buildings erected in California. The company's three big warehouses in Oakland have a capacity of more than a million feet of lumber. A big stock is kept on hand continually, so that all orders may be filled promptly and to the entire satisfaction of the buyer. There has been a good market in California for the "Tafco" brand, quartered and plain sawed white and red oak. This brand is manufactured in the most modern and thoroughly equipped plant in the country, and located in the heart of the choicest oak district in the world. The main sawmills of the company are at West Branch, Mich.; the maple flooring plant is at Saginaw, and the oak flooring plant at Nashville, Tenn.



The Main Plant at Saginaw, Mich.

Cliff House, San Francisco
Hardwood Furnished by Strable Manufacturing Company

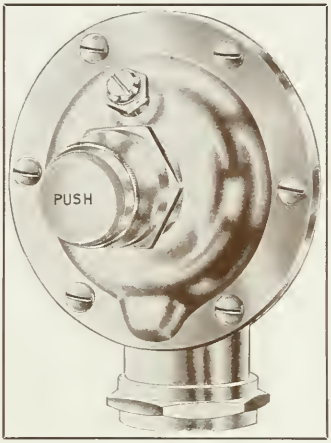
The Strable Company is also handling the popular Australian hardwoods, besides mahogany, cherry, hickory, ash, birch, ebony and rosewood. Special attention is given to maple flooring, and shipments are made in carload lots to any point in California. The Oakland branch is in charge of G. H. Brown, who was with the company as office manager and buyer in the East. He is energetic and popular with the trade.

Some of the more important orders filled the past year include 200,000 feet of maple flooring for the State Normal School at San Jose; a carload of the same wood for the Emporium, in San Francisco; over thirty carloads of maple for the State Hospital buildings at Agnew; large quantities of oak for the Lincoln, Washington and Prescott school buildings, in Oakland; substantial consignments for the Cliff House, San Francisco; Home for the Adult Blind, in Oakland; Grammar school at San Leandro; Stockton hotel, Stockton Savings and Loan building, State Hospital at Napa, Merced high school, Labor temple, Goldberg, Bowen & Co.'s building, and Barron estate building, San Francisco, and the Richmond high school.

A general idea of the magnitude of this institution may be gathered from the fact that it has on its payroll, including woods, manufacturing and sales departments, about 3,000 men.

The active management of the Strable Manufacturing Company's business is in the hands of George Strable, vice-president and manager, who has had many years of experience in the flooring business. The other officers of the company are H. A. Batchelor, president, and J. T. Wylie, secretary and treasurer.

Home for Adult Blind, Oakland
Hardwood Furnished by Strable Manufacturing Company



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Naples Hotel	Los Angeles, Cal.
Los Angeles County Jail	"
Masonic Building	"
Stimson Building	"
Castle Towers Apartments	"
Apartment House, 4th and Olive Streets	"
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THE STANLEY WORKS

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The Tall Structure is the Whittell Building Dodd's Blocks Used for Partition Work

Demand for Interlocking Plaster Blocks

SINCE the agency of Dodd's Interlocking blocks was placed in the hands of Messrs. Boyd and Moore for the California territory, and T. F. Crowe & Co., for the Pacific Northwest, the demand for the blocks has trebled. Material improvements have been made, at no small expense, and the manufacturers now claim their product will stand the test with any other fire-proof partition in the market. The blocks compare very favorably with metal lath or terra cotta in fire and sound-proof qualities. They are now made in machine metal moulds and, therefore, are absolutely true and uniform. Every block is placed in a kiln and made bone dry before it is delivered on a job. This is a positive guarantee that it will neither warp nor shrink. The ends of the block are grooved out to furnish a perfect plaster-key. They lock together so perfectly that an absolutely smooth surface is obtainable. But a single coat of plaster is required to give the partition a perfect finish. The blocks are made in sizes varying from two and a half inches to four inches. They save space, are proof against germs, and have repeatedly demonstrated their resistance to fire. They are easily and quickly put up, and it is not necessary to wait for the partition to dry, as is the case with plaster. The blocks, as already stated,

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Albert Pissis, Architect

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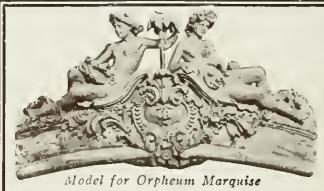
SAN FRANCISCO, CAL.

are kiln dried before they leave the factory.

Architects Reed Bros. have used the blocks, with satisfactory results, in the David Hewes building, a fifteen-story office structure recently completed in San Francisco, and the same firm has specified the blocks for a building of similar size now being erected for Mr. Yeon, at Portland, Ore. The blocks are to be used in the Holbrook, Merrill & Stetson building, on Market street, near Front, San Francisco, from plans by Architects MacDonald & Applegarth, and the same architects have used them in the St. Marcuis hotel, in San Francisco. Architect William H. Weeks specified the blocks for the St. Francis Realty Company's $100,000 hotel, to be erected on Mason street, San Francisco. The Sheldon and Whittell buildings, in San Francisco, both have Dodd's blocks in them, and the owners are pleased with the way they have worked out.

Upon receipt of a letter or postal card, Messrs. Boyd and Moore will be pleased to supply architects with further information in regard to the blocks.



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PACIFIC COAST STATES

OCTOBER, 1910

Some of San Francisco's New Municipal Buildings

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Engineering Features of the Western Pacific Railway

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VOL. XXII
No. 3

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KNIGHTS OF COLUMBUS BUILDING, SAN FRANCISCO
Smith O'Brien, Architect

Frontispiece
The Architect and Engineer
California
October, 1910

SAN FRANCISCO
PUBLIC LIBRARY

THE

Architect and Engineer

Of California

Pacific Coast States

VOL. XXII. OCTOBER, 1910. No. 3.

Knights of Columbus Building, San Francisco

SINCE the San Francisco fire of 1906 there has been much activity among the fraternal societies of that city in the way of building homes for themselves, and many beautiful and costly buildings have been and are being erected by them. Some months ago San Francisco Council of the Knights of Columbus purchased a fine lot on the north side of Golden Gate avenue, between Jones and Leavenworth streets, having a frontage of 68 feet 7 inches, and a depth of 137 feet 6 inches, and upon this splendid site the erection of one of the finest buildings on the Pacific Coast has been commenced. It is hoped to have the building completed by the end of next year. The structure will be Class "A" fireproof construction throughout and will cost in the neighborhood of $150,000.

The exterior shows a very interesting design in the style of the Spanish Renaissance, and will be executed in a beautiful white stone. The interior will be finished in keeping with the requirements of the building, including an elevator, and will contain the following arrangements of the different floors.

In the basement will be a large banquet hall or jinks room, also kitchen, pantries, toilet rooms, cloak rooms, and a machine room containing a complete heating and ventilating plant.

The first floor will contain a magnificent auditorium and foyer, also a large stage and gallery, which will be especially suitable for concerts, meetings, theatricals or balls.

The second floor will contain three fine lodge rooms, the largest one being arranged for the meetings of the order, and all being desirable for renting purposes.

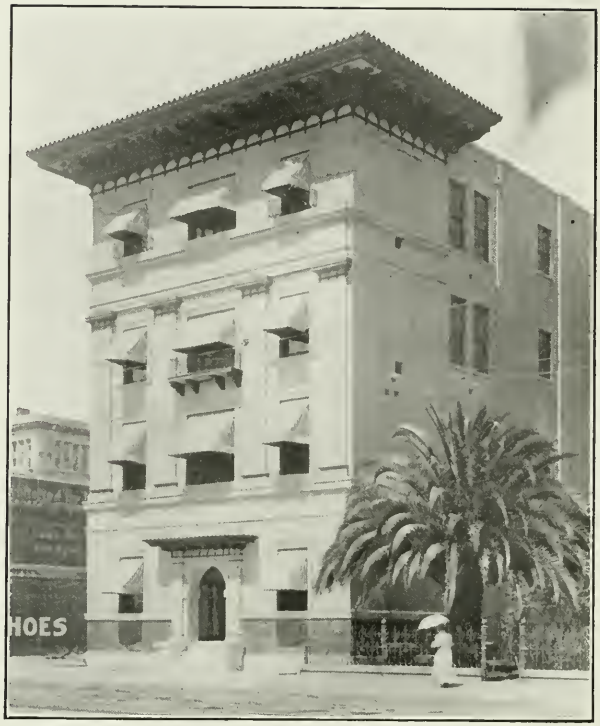
The top floor will be devoted to club rooms for the Knights of Columbus and will be very attractively and comfortably arranged including a large gymnasium and bathing facilities.

Smith O'Brien is the architect.

* * *

Some Recent Examples of Interior Architecture

IT IS gratifying to note the growing tendency to erect better buildings in the interior cities and towns of the Pacific Coast States. The improvement is particularly noticeable in the construction of county buildings, semi-public structures and homes for banking institutions. Unsightly piles that have served as Halls of Record and Court Houses are being replaced with substantial, well-designed fire-proof structures, while anti-



Pacific States Telephone Building, San Jose

quated frames that have served as banking quarters have been transformed into monumental buildings of one and two stories that give unmistakable signs of solidity and progressiveness.

All this is pleasing to the architect who appreciates that the day of the architect-contractor who designed and built at the same time, has passed. The public realizes that it pays in the end to employ a professional man to superintend as well as plan the work, be it a modest residence or pretentious commercial building. The slight additional cost is trifling when one considers the advantages to be gained by employing competent service. It is with the idea of still further encouraging high-class country work that a number of pages of this issue are devoted to suburban architecture. Space will be given regularly to this class of buildings in future numbers.

A Fireproof Telephone Building

By ARTHUR E. CALDWELL.

THE accompanying photograph shows the Pacific Telephone and Telegraph Company's new main office and operating building, which recently has been completed at San Jose, Cal. Attractive and dignified, the building is one of the most costly and substantial structures in the Garden City. The plans were drawn by the company's engineers who have worked out a pleasing treatment in the Spanish Renaissance. The structure has a frontage of forty feet and is built upon a 52 x 137½-foot lot in the center of the city.

The building has a complete steel frame. Brick is used for exterior walls and the floors are of reinforced concrete. All openings of the building are equipped with metal frames and wire glass is used for the windows. The entire finish is of metal and other non-combustible material. Over all doors and windows are mounted automatic roller metal guards. In every sense of the word the building is fire-proof.

The heating plant, power machinery and cable runs are located in the basement. Various offices of the commercial, traffic and plant departments occupy the first floor, together with public booths for local and long distance switching. The use of the second floor is confined entirely to telephone apparatus and machinery. The local subscribers' switchboard, cloak-rooms and main lavatories are upon the third floor. Spacious retiring and lunch-rooms are located on the fourth floor. The long distance switchboard is also on this floor, occupying the entire front portion of the building. Arrangements were made in the original plans for an ultimate growth of two additional stories and for substantial extensions to the building.

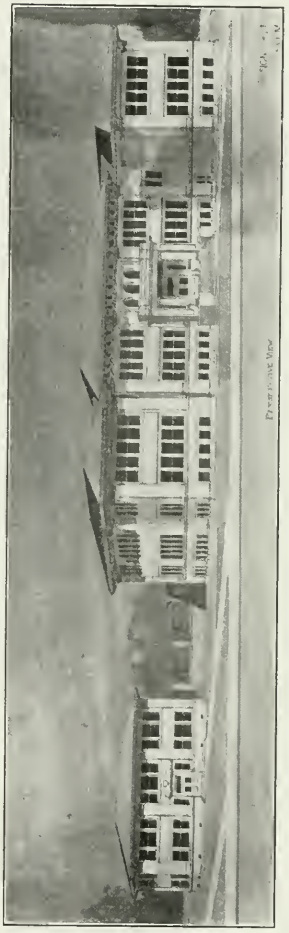
* * *

Novel Plan for Group of High School Buildings

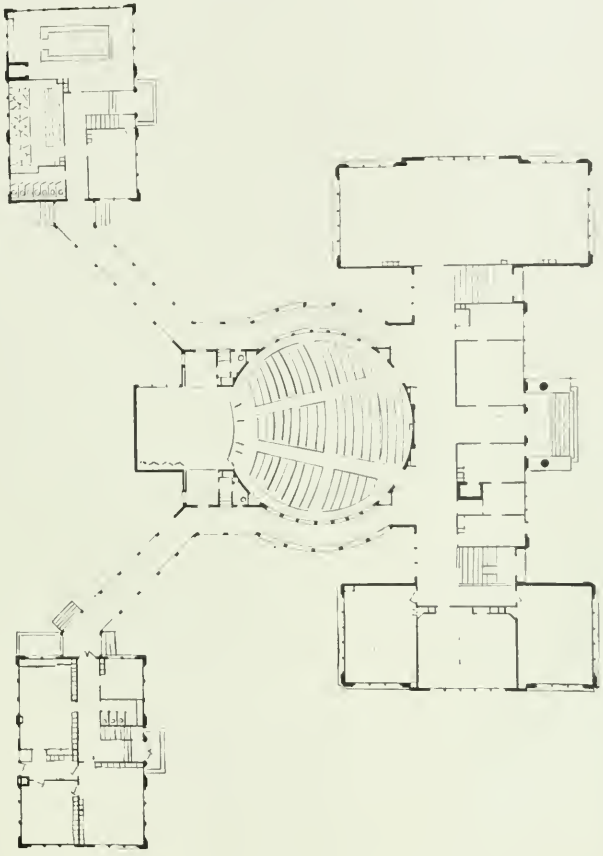
ARCHITECT ROBERT H. ORR of Pomona has been successful in a competition for a group of buildings to be erected at Claremont for the high school and polytechnic departments. The group consists of one main building, two stories in height with basement extending half above ground, with which is connected a two-story wing, providing a circular auditorium with seating capacity of about 500 pupils; domestic science and manual training buildings and a gymnasium. The accompanying illustrations show the perspective of the main high school building and one of the science structures, and the manner of connecting the group with concrete cloisters, which will be covered with a clay tile roof; also the first and second floor plans, which give an idea of the layout of the high school structure, the auditorium and the two science buildings. The gymnasium will be located on the rear of the lot.

The style of architecture is Spanish Renaissance. The main features, in general effect, are attained by plastered exterior walls, low pitched clay tile roofs and broad eaves. The covered cloisters or arcades enhance the general effect from many points of view.

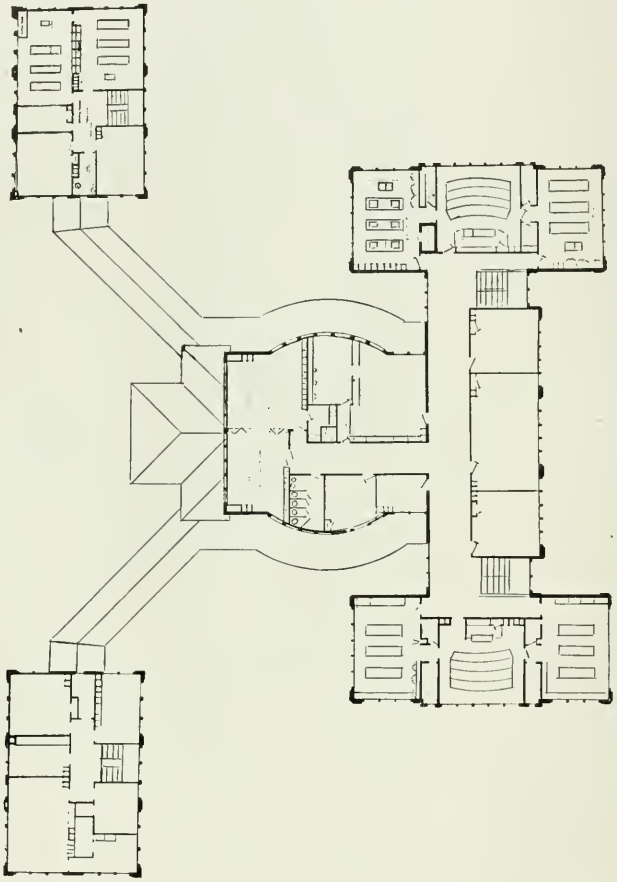
The high school building is planned in the manner of an extended letter H, with over-all dimensions of approximately 175 feet frontage and 84 feet depth. The auditorium, connected with the main building as a wing extending from the center in the rear, is circular and 64 feet in diameter, and is encircled by arcades. The construction of this building



Competitive Design for Group of Buildings for Polytechnic High School, Claremont, California
Robert H. Orr, Architect



Polytechnic High School, Claremont, Showing Floor Plan and Manner of Connecting the Several Buildings with Concrete Cloisters
Robert H. Orr, Architect



Floor Plan, Polytechnic High School, Claremont, California
Robert H. Orr, Architect

and auditorium will be semi-fireproof, with reinforced concrete walls and floors, timber ceiling joists and timber roof trusses.

A basement will be excavated under the high school building for class rooms, locker rooms, bicycle rooms, etc., but it is not the intention to finish these rooms at the present time. This basement will be reached by two flights of stairways and inclines from the outside. The main floor of the high school building will have a study room in the right wing, its dimensions being 32 x 80 feet. In the left wing will be provided three class rooms, each 24 x 32 feet. To the right of the entrance will be the principal's room and men-teachers' room; to the left a room for the Board of Education and rest room for the women teachers. Two flights of stairways lead to the second floor.

One of the main features of the idea worked out by the architect in this group of buildings will be the circular auditorium. It is surrounded by a foyer which forms a cloister leading to the science building, making the latter accessible from the main building and auditorium without exposure to storms. The auditorium floor will be stepped from the grade level to the height of the main floor, exits opening directly out into the school grounds. The auditorium will have ample stage and dressing room facilities.

On the second floor will be located the chemistry and physical laboratories, with a lecture room between, also biological and physical geography laboratories with lecture room between. The plans also provide for one large and four small recitation rooms, commercial and typewriting department, freehand and mechanical drawing rooms, store room, fire-proof vaults, private laboratories, etc.

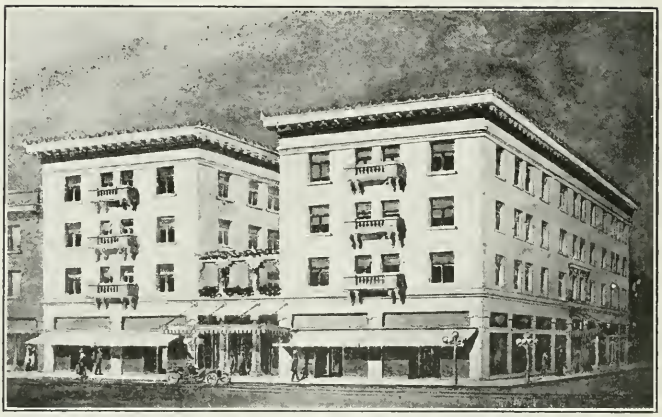
The manual training building will be two stories in height, 50 x 70 feet, with reinforced concrete walls, timber construction, clay-tile roof. On the first floor will be lathe, foundry and working shops, office, finishing-room, stock room and wash room. On the second floor will be a pattern shop, draughting room, recitation room, blue-printing room, teachers' rest room, etc.

The domestic science building, which will duplicate in main features and which will occupy the same relative position to the main building as shown by the manual training building, will be provided on the first floor with girls' locker room and toilets, cooking room, kitchen, pantry and girls' rest room. On the second floor will be the sewing and millinery room, recitation room and store room.

* * *

Reinforced Concrete Hotel

ARCHITECT WILLIAM BINDER of San Jose has worked out an attractive scheme for a combination transient and family hotel which is now under construction in the Garden City. The building is to be four stories and basement and entirely of reinforced concrete, steel bars and triangular mesh being used for reinforcement. There are 140 rooms, single and en suite, and each has an outside exposure. The interior is to be finished in marble and hardwoods and all modern conveniences have been arranged for, including electric elevator service, hot and cold water in every room, vacuum cleaning and steam heat. The estimate cost of the hotel is $150,000. Z. O. Field is the contractor.

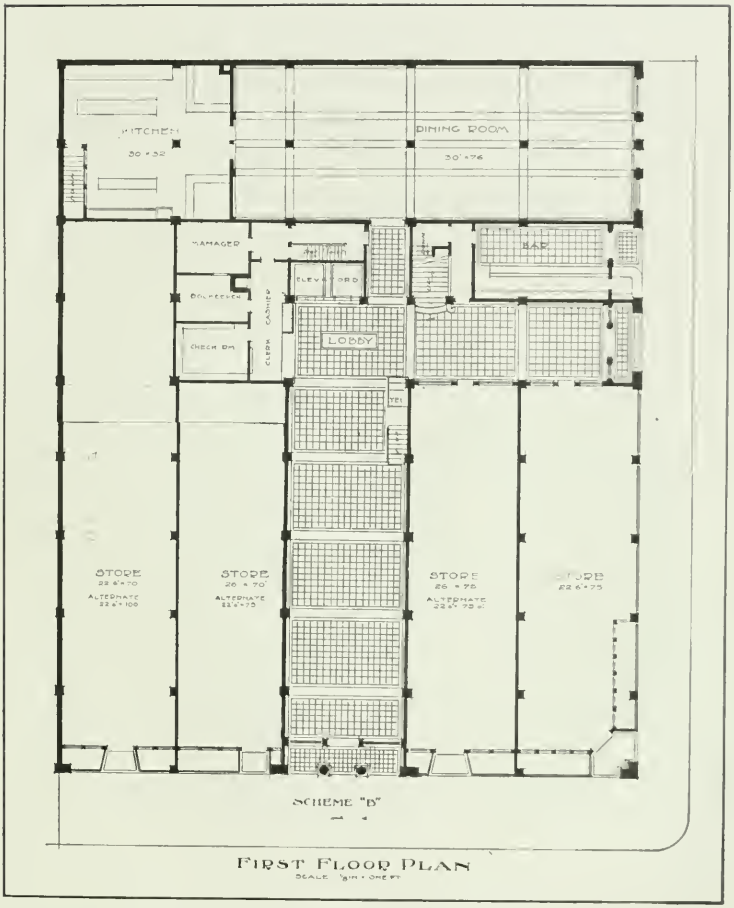


Hotel for the Conservative Realty Company, San Jose
William Binder, Architect

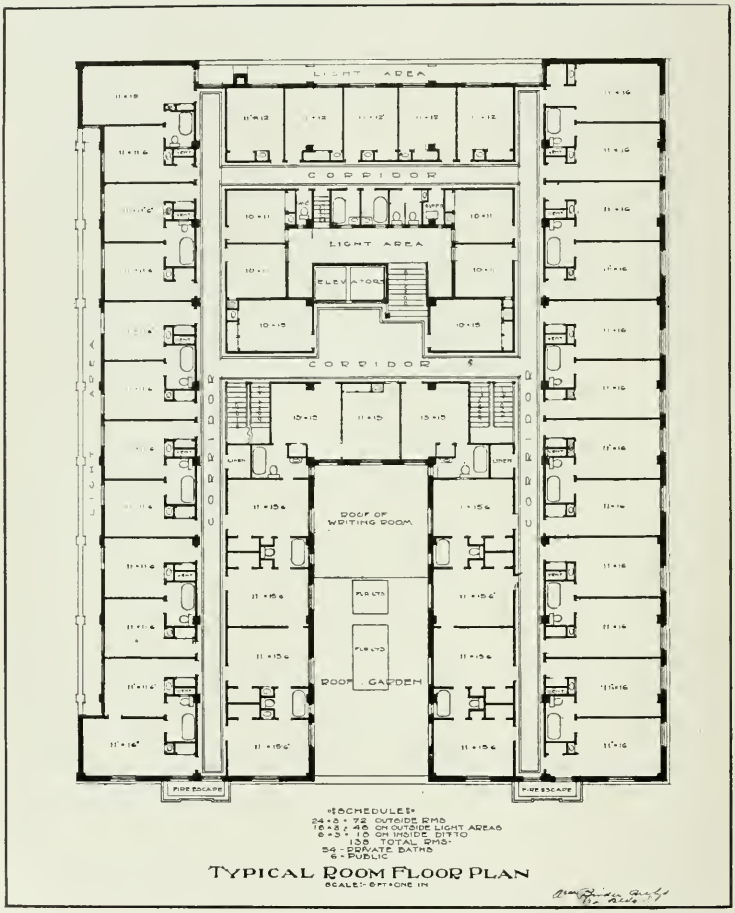
California Residence Architecture

SOME months ago we had occasion to remark in these columns that while improved transportation facilities have exercised, in some respects, a stimulating influence on building operations the country over, this influence has not always resulted for the good of the architectural standard of a community. A striking instance which would bear out this theory is to be found in recent California residence work. If there is a section of the United States which possesses a style in its residential work that section is undisputably the Southern coast of California. Its distinctive manner of building and designing has a legitimate origin in the Spanish traditions of the old local Missions and was developed therefrom in accordance with climatic and topographical conditions and modern needs and improvements. The materials employed were those readily obtainable near the site and the methods of handling these grew naturally out of their characteristics. The result, therefore, was faithful to local tendencies and was distinguished by honesty of construction and by simplicity of design and decorative treatment. The materials naturally employed were wood, which has a long life under the mild and uniform climate and exists in abundance and of excellent quality, brick covered with stucco and stucco applied to a wooden framework.

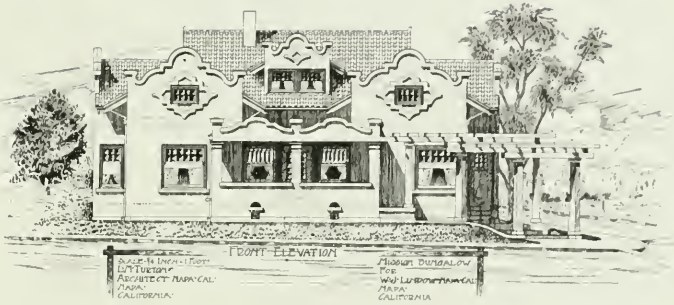
In recent years there has been a great influx from the East into the residential colonies of California, and many of the features and materials which have heretofore been typical of the homes on the Pacific Coast have apparently given way to new ideas of Eastern clients with whom a local architect has either not had sufficient authority or an Eastern architect was employed who was himself not sufficiently in touch with conditions to perpetuate what is best in the California traditions. Accordingly, we now see in the Coast resorts residences of foreign origins that would look more



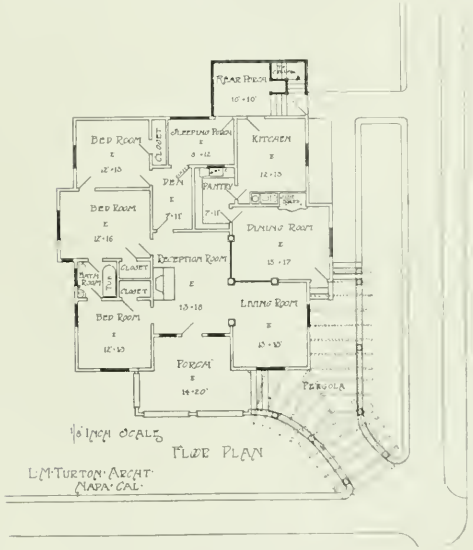
Hotel for the Conservative Realty Company, San Jose
William Binder, Architect



Hotel for the Conservative Realty Company, San Jose
William Binder, Architect



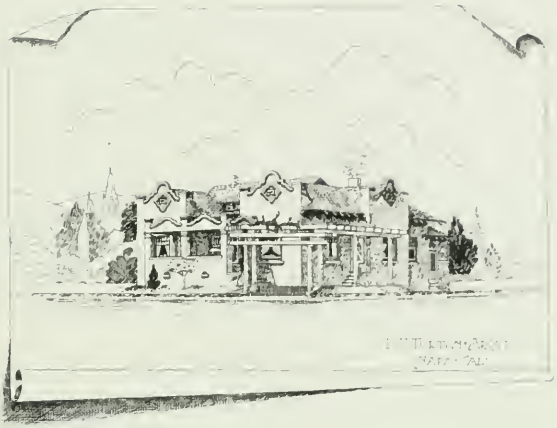
Design for a Mission Bungalow
L. M. Turton, Architect



Floor Plan of Mission Bungalow

Residence of Mr. H. H. Sawyer, Napa, California
L. M. Turton, Architect

Design for Masonic Hall at Yuba City, California
L. M. Turton, Architect



Sketch for a Mission Bungalow
L. M. Turton, Architect

Gardner Store and Apartment Building, Sacramento, California
C. W. Dickey, Architect

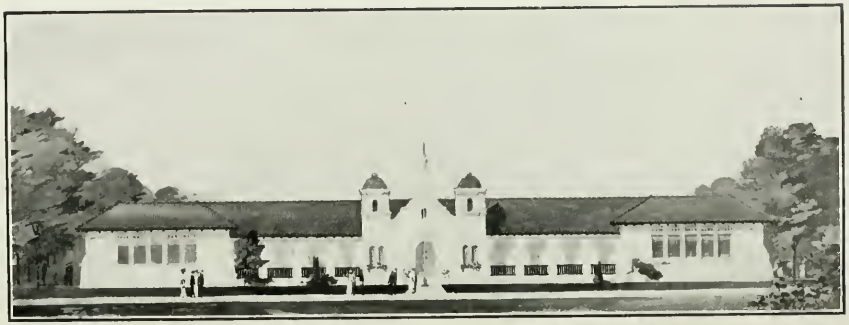
Nicholas Building, Sacramento, California
C. W. Dickey, Architect

Capwell Department Store Building, Oakland
C. W. Dickey, Architect

Elks' Building, Marysville, California
Walter H. Parker, Architect

in place in almost any other environment. The bulk of important recent residence work, however, which adheres to local traditions holds out the prospect that the extraneous influences are only temporary and will, in time, be forgotten in the total achievement of Californian residence architecture as a distinctive expression of one of the most delightful phases of American life.—The American Architect.

Grammar School, Orland, California
Parker & Kenyon,
Architect and Engineer



Union High School,
Lincoln, California
Parker & Kenyon,
Architect and Engineer

Carnegie Library, Livermore, California
William H. Weeks, Architect

Oakland Residence in the Spanish Renaissance

The Truth About Concrete

THE following extracts from a paper in the Technical World Magazine, by Mr. Benjamin Brooks, are worth consideration. Whether this is an "age of concrete" or a "spasm of concrete" we do not know; and, there is, perhaps, a touch of exaggeration in the statement that "a generation ago we used it as the Romans did—in masses only. A decade ago we began pouring it into what were then miraculously thin walls and floors for buildings. Today we make railroad ties, rail fences, and telegraph poles out of it; and tomorrow small boys will, no doubt, be flying concrete kites. But it is probably true that if the present preference for reinforced concrete does prove to have been a "spasm," it will be in no small degree due to some of the causes which Mr. Brooks speaks of:

"A wealthy manufactory—one of the best known in the country, one that prides itself on its model shops, its broad-minded treatment of its workers, and the excellent photographic paraphernalia it sells all over the known world—attempted to erect a concrete building. The building, however, fell down. The coroner, upon investigating causes for the accident, found that certain columns of the structure were of very crumbly concrete in spots, that they were weakened by the admixture of sticks and sawdust, that the reinforcing bars were in some cases of the wrong kind, in other cases wrongly placed, and in still other cases omitted entirely. He accused the building contractors of criminal carelessness for furnishing building plans not in accordance with specifications; he accused their constructing foreman of criminal carelessness for leaving in sawdust and leaving out steel, and the owner's representative of the same criminal carelessness for not being on the spot with his eyes and his wits about him. Doesn't it seem strange that a great company who could do everything else so well should be outdone by human niggardliness and carelessness in this seemingly simple undertaking of a concrete building? But I recall an accident in a building where nobody was guilty of any such thing. On the contrary, the builders had gratuitously enriched the concrete in the lower part of a main girder to give a better safety factor. But the girder failed all the same. Apparently the extra rich concrete failed in some mysterious manner to unite with the standard mixture above it, thus leaving a line of cleavage.

"Turning next to some curious accidents to piers and breakwaters, we find even the United States Government occasionally meets with concrete disasters. The Bureau of Yards and Docks, using their greatest care and the finest materials, built a concrete bulkhead around the Charlestown Navy Yard in Boston Harbour. In about seven years it was almost a total wreck. Some engineers said it was frost; but the bureau wisely ventured no haphazard explanation. In the harbour of Baltimore was built a pier with expensive concrete piling under it. And now the piling begins to be eroded or rotted just at the water's edge. This time the experts ventured that it might be city sewage or floating ice. In my own mind I am satisfied that neither frost nor ice nor sewage worked this havoc, for I have seen concrete piers placed with the greatest care in water where frost and sewage never were known, which nevertheless after five years, a chicken could eat with a relish. Turning from the influence of salt water to the inland, we find one of the principal uses of concrete is for drains and sewers. It seems an admirable material for such purposes—easily formed to any shape or size, and very cheap. Yet when the tile interests—the arch enemies of concrete sewers—wrote inquiries here and

there as to how concrete sewers were holding out, they received answers from several laboratories and universities of standing, from Chicago, Ill., Patterson, N. J., Springfield, Mass., Portland, Me., Memphis, Tenn.—about a dozen principal cities in all—to the effect that concrete sewers were a dismal failure. A few years underground and the sewer acids and sewer gases reduced them to crumbling wrecks.

So much for sewers; but even in the case of clean irrigating water we are not free from disaster. For in the Shoshone and Sun river projects the Reclamation Service, despite its well-earned reputation for doing good work, found after a few years that certain concrete drains which they had laid with great care were reduced to streaks of sand. Then we have accidents from cold weather—a long string of them not worth citing and two very peculiar ones which are. One is the failure of an arched filtration-chamber in Lawrence, Mass., which seemed never to have hardened properly, although it was covered with manure in the proper manner to warm it and shield it from the frost. The other is the strange disintegration of the floors of a building which was built in midwinter, but carefully surrounded by canvas and kept warm within by charcoal fires. It can be proved that frost never touched these floors, and yet——. Finally we arrive at the failures by fire. It is not necessary to catalogue them. After the Baltimore fire accounts appeared in insurance magazines of how concrete floors were shoveled out of the windows and down chutes like so much crumbled plaster. Columns and beams were disintegrated or transformed by heat into a chalky powder for varying distances from their surfaces according to the degree of heat. After the San Francisco fire photographs appeared showing concrete in heaps and reinforcing bars bulged and twisted into ruin. This, in spite of the fact that concrete is vociferously advertised as a thoroughly fireproof material. 'But,' says the reader, 'in these same fires and under similar conditions other materials suffered also. If your concrete sea-walls had been built of wood you would have fared no better.' Exactly! We have, indeed, failures in all building materials. Tile fireproofing cracks, brick chimneys crumble, wooden buildings burn, steel bridges collapse, stone campaniles fall, and if failures in other materials seem not so frequent or so involved in mystery as failures in concrete, that is still not the main point. So little thanks or distinction is to be got from the mere writing of disparagements—a job for any smith's apprentice with a hammer—that the discerning reader will easily begin to suspect me of having some other more worthy object in view.

"My object, far from being a mere knock or even an unfavorable comparison, is, in fact, to show that the general popular conception of the modern reinforced concrete is quite wrong; that we have not looked at it from the right angle; that we misuse it, misunderstand it, subject it to great injustice, and then blame it instead of ourselves. We bank, for instance, on the much-advertised statement that concrete is absolutely fireproof. But a moment's thought will show anyone that it cannot be; for it is known to contain in its crystalline construction a certain necessary quantity of water which, when subjected to sufficient heat, must turn to steam and explode just as the water in salt crystals snaps and cracks when they are thrown on a hot fire. After reaching about 600° F., concrete surfaces begin to lose this water and to crumble; and it would seem only common sense to provide against this by embedding the reinforcing rods something more than the customary scant inch, so that in a prolonged conflagration they would not become exposed and warp and bulge,

thus destroying the whole structure. Either this, or arrange building laws, fire regulations, taxes and penalties in such a way that a fine group of concrete buildings would not have to stand and be roasted to a white heat by the burning of a surrounding mass of wooden shacks. Granite of the everlasting hills is fireproof also, but it would never stand that; and it seems a trifle egotistical to expect a home-made substance of our own to stand it, however well advertised it may be. In the case of concrete sewers we seem to be quite as unreasonable and quite as disappointed. For since all sewers must reek with acids, and since these acids are known to have a marked effect on lime; and since, further, cement contains a large per cent of lime, it should not require more than Shakespearean imagination to foresee what would happen to an acid-bearing concrete sewer. Little imagination is expended, however, in this line, and little science in proportion to the money spent. The specifications and building regulations are more often copied from one city to another, mistakes and all, without much study or investigation. Other forms of concrete failures—the wrecked bulkheads and irrigating ditches—seem to be rather more involved, giving us more excuse for having made mistakes in those directions, but capable of explanation and prevention all the same, as we shall see later. But the most flagrant mistake of all, which works the greatest injustice upon our new building material, is regarding concrete design and concrete construction as a simple, easy matter that any unskilled laborer with a shovel can accomplish. It looks simple when you see it flowing into forms so easily and rapidly. It even feels easy when you do it. Only after your work has had time and trial to show its weak points do you begin to see how difficult it is to do well. And it will take some space and a lot of dry explanation to dispel the idea here.

To begin at the beginning, the reader is invited to obtain at his own expense about forty common soda-crackers and a good-sized needle and thread. He will note that each cracker is pierced with sixteen holes, and with the assistance of his nearest female relative he is requested to stack the crackers evenly as they originally came packed, and to thread them together tightly by passing four threads through four holes nearest any one edge of the cracker, and knotting them snugly at each end of the stack. Next he is to place two inverted tumblers upon a table and rest his stack of crackers horizontally one end on each tumbler, so that the four threads are on the downside. Following this recipe closely will give him a simple working model of a concrete beam—a soda-cracker beam which will hold itself up and span the distance between the tumblers. A slight pressure of the hand will cause the crackers to squeeze together on their upper edge, and at the same time cause a strain on the four threads near their lower edge; and this is exactly the condition in any simple beam. The crackers correspond to the concrete and the threads to the steel bars. If the downward pressure on the beam increases, it will finally break in one of four ways. The crackers may crush at their upper edge; or the threads may break or the knots at the ends may pull through the holes and slack them up; or the crackers may slide past each other, the end ones up and the middle ones down—thus shearing the threads or tearing them through the holes. All these phenomena are exactly paralleled in a failing concrete beam. The concrete may crush, or the bars may break, or pull out, or the whole thing may be sheared to pieces; and the game of designing concrete structures is a matter of adjusting two different materials in such shapes and proportion so as to waste no crackers and no thread, but to have the combination equally strong at all points. But, since the relative

prices of steel and of concrete materials vary in different localities, there can never be any standard design, but each structure is a new problem in itself. Add to this the fact that the designer is not dealing in rigid substances, but elastic ones. According as our crackers are brittle or soft, and our threads stretchy or not, the ratio is going to be altered, and our points of greatest strain are going to shift about. Moreover, while the steel bars have a certain stretch for each increase of pressure, the concrete has another stretch or squeeze ten or fifteen times greater. Worse still, while the stretch of the steel is uniform the squeeze of the concrete becomes greater and greater in proportion to its load, as a falling body goes faster and faster every second. Here is a most delicate matter for bald heads and spectacles and differential calculus. But nobody engaged in the actual design of a concrete building could ever stop to go through all its details. All we can hope to find time to do is to go by certain rough-and-ready approximations which seem to answer the purpose well enough in most instances; yet the latitude which concrete designers allow themselves may easily be shown by quoting from a very interesting talk by Mr. Ernest McCullough. After stating how very indefinite and uncertain most specifications for reinforced concrete are, and describing how it is often necessary to work twenty hours a day for three days on a set of plans before submitting a detailed design, he assumes that five different men with five different theories and degrees of honesty, set to work to design a concrete floor. The first man—a very honest one—obtains a floor 7 inches thick. His steel carries a strain of 16,000 pounds per square inch, and his concrete sustains a pressure of 700 pounds. The second man gets a 5½ inch floor; but his steel and concrete stresses rise to 20,000 pounds and 940 pounds respectively. The third man, not so venturesome, arrives at the same thickness of floor with 17,000 pounds and 890 pounds respectively for steel and concrete. The fourth man—presumably an honest boy just out of college—designs a 6 inch floor with stress of only 8,350 pounds and 278 pounds; but he hasn't a snowball chance of getting the job, for the other less conscientious men have beaten him on price. The fifth man, having but one object in view—to get the job and the money (the devil take the consequences) designs a 4½ inch floor, runs his stresses up to 19,050 pounds for steel and 1,195 pounds for concrete, and under the loose-jointed, indefinite rules of the game, he is the victor and claims the spoils. From these figures it is easy to see that by its very newness and lack of all standards, by its danger from human cupidity, and by its combination of two totally differing and varying elements reinforced concrete furnishes difficulties even in its design never before presented by any structural material since men first began piling one stone on another. Suppose, however, that a safe and economical design has been arrived at, how are we to specify that it shall be carried out?

Most concrete is composed of three separate things—cement, sand, and broken stone or gravel, and in order to be sound and strong the sand must just fill the spaces between the stones, and the cement must just fill the spaces between the particles of sand—as, for instance, we might fill a bucket full of oranges, then pour marbles in between the oranges and shot in between the marbles till no voids remained. But since no two rock-crushers run the same and no two carloads of sand are the same, this is a matter which cannot be proportioned beforehand, but must be done on the spot with no more delicate instrument of measurement than a string of rapidly-passing wheelbarrows gauged by the eye.

Mr. F. H. Meyer, a well-known architect of the West, said to me:—"I do all I can to experiment beforehand with my materials and to specify exactly; but when we start concreting a building I go down myself and stand by the mixer until I get the stuff just right." No other material that he uses would exact the same personal attention.

Next we come to the cement. It is easy to specify what cement shall be; but while a steel bar or a brick or a stick of timber may be tested in an hour—almost at a glance—cement requires twenty-eight days to test after it has reached its destination. Think of the strong temptation on the one hand, to make substitution; and on the other hand, the watchfulness to prevent any manner of underhand dealing in all that time! And the best cement can be "killed" by a little organic matter in the sand.

Lastly comes the water. But since the other materials cannot be measured exactly, neither can this. It is a matter of skillful guesswork, and five per cent too little may prevent the mixture from flowing into all the angles and crevices, while five per cent too much may cause the cement to wash away, leaving barren sand and rock behind it. And having mixed it properly, then comes the problem of keeping it mixed. Every moment it stands in the wheelbarrows or in the forms the stones are settling to the bottom and the "soup" is coming to the top, and every moment after water touches it, that strange, unaccountable, indefinable, chemical action is going rapidly on and we must keep ahead of it. Even after we have placed it in the forms it is not safe. A bit of running water, a slight shift or a leak in the wooden frames, a hot sun or a touch of frost—even the smoke from a chimney or a drain from a stable—and our efforts are all for nothing, our money wasted, our good reputations gone. In the face of these many difficulties it seems a bit unreasonable of my friend who gave his contract to the lowest bidder who in turn hired the most unskilled labor and the poorest-paid foreman, to disparage concrete because his cellar leaked. It seems a bit lacking in the choice of words when Mr. T. W. Brown, a cement engineer, says:—"It is perfectly safe to say that in the ordinary use of cement concrete the work is so carelessly done that there is always danger of the work being seriously injured by infiltrations of alkali solutions." It seems a bit hasty of Dr. W. Michaelis, Jr., a cement expert, to say that, "All Portland cement is doomed in time in sea-water," but much more natural to observe with the editor of "Engineering News" that "The behavior of concrete in sea-water is hardly uniform and not a matter of exact explanation."

*
* *

Foreman "Falls," Too

He was a twentieth century hustling builder, and under his auspices cottages and buildings seemed to spring up like mushrooms.

"Please, sir," said one of his foremen, rushing up to him one morning in a state of mental collapse, "one of the new houses has fallen down in the night."

"What?" he roared. "you mean to say that one of my well-built, desirable residential houses has come to grief? Ah, I suppose you took the scaffolding down before you put on the wall paper?"

"Yes, sir."

"Well, what can you expect, you rank outsider? Call yourself a foreman? Get off the works. You're fired."

Fig. 1—Showing Steel Girder and Wooden Trestle Before the Explosion

Dynamite Used to Aid Unique Bridge Construction

By O. J. CROSSFIELD.*

THE work represented in the accompanying photographs is the replacing of the wooden trestle bridge across Dry Creek, between Stockton and Merced, on the Santa Fe Railway, with steel girders of 80 and 100-foot spans. The longest permissible time for changing one span was four hours, which is the schedule time between trains.

To accomplish this work, the girders were assembled in pairs and riveted together at the nearest siding, and as soon as the girders were ready for placing, two derrick cars were employed to carry them from the siding to their permanent place, the 100-foot girders with ties complete weighing ninety-two and one-half tons.

The trestle-work being a very substantial and permanent affair, as may be seen by the cuts (there being six piles in each bent) it would have been impossible to remove the same by ordinary means and put the girders in place in the required length of time.

We therefore broke off fifteen feet of each post in the trestle by the use of dynamite. The upper portion of the post was left intact, as may be seen in the photograph, marked Fig. 3.

The following is a brief description of the work: As soon as the last train passed the siding where the girders were assembled, the derrick cars, moved by a locomotive, would take the girders to the bridge, the derrick cars being placed so that the girders were immediately over their permanent position. Then the rails and ties were removed from the old structure so they could be used again after the girder had been put in place.

This being a gravel deck girder bridge, the lower course of ties, consisting of 8 x 8 creosoted timber, are put close together to permit of gravel ballast being put on top of it and necessarily lower than the bottom of the permanent track ties; therefore, the solid deck of 8 x 8 creosoted ties was put in place first, then the 7 x 16 timber was placed longitudinally under the track ties to give the track the proper elevation. This is the

*Vice-President and General Manager, Thomson Bridge Co., San Francisco.

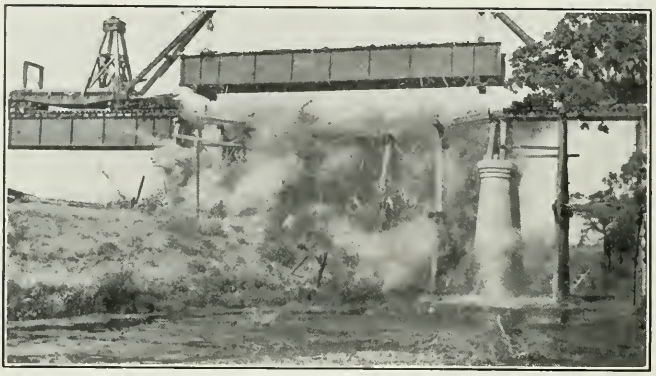


Fig. 2—Dynamiting the Old Wooden Trestle to Make Way for Steel Girder.

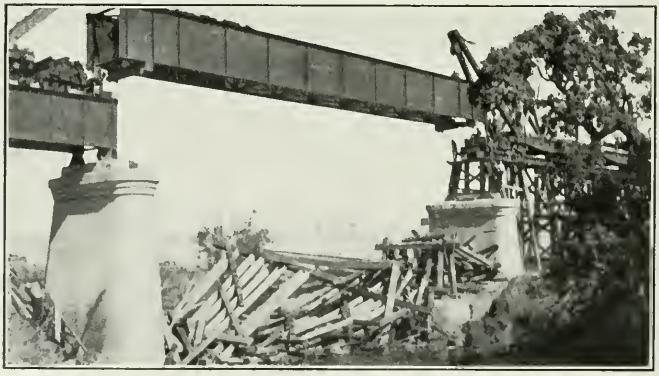


Fig. 3—Old Trestle Two Seconds after the Explosion

reason why the rails and ties of the old structure had to be preserved so as to use them for the track until the ballast was put on.

Then after everything was in readiness, the dynamite in the post was exploded by means of a battery, as seen in Fig. 2.

Fig. 3 shows the old trestle on the bottom, about two seconds after the explosion occurred, after which the girders were lowered into place and the temporary track laid to permit the passing of the trains.

The whole proceedings averaged two hours and forty minutes from the time the last train passed until the track was ready for the next train.

The construction of the derrick cars was as follows:

Two 40-foot steel cars of 50-ton capacity were coupled and bolted together so as to be able to travel without changing the distance from end to end. Then cross timbers were put on the cars about every ten feet, the tops of them being thoroughly greased, sills being placed on top of these cross-timbers, reaching from one end of the cars to the other to receive the tower, boom and hoisting engine. These sills were framed together the same as a bridge cord, having a substantial lateral system so as to permit the cars to travel around curves, only the ends of the sills being fastened to the car.

Then the tower, consisting of 12 x 12-inch timbers with the proper bracing, was erected on one end of the cars, and an A fráme boom, consisting of 14 x 16-inch timbers, 30 feet long, with heavy shackles and head-irons, and supported by back guys fastened to the head-irons and to the rear of the car (which besides having the hoisting engine on it, also carried fifteen tons of rails for ballast) was put immediately ahead of the tower on the forward car.

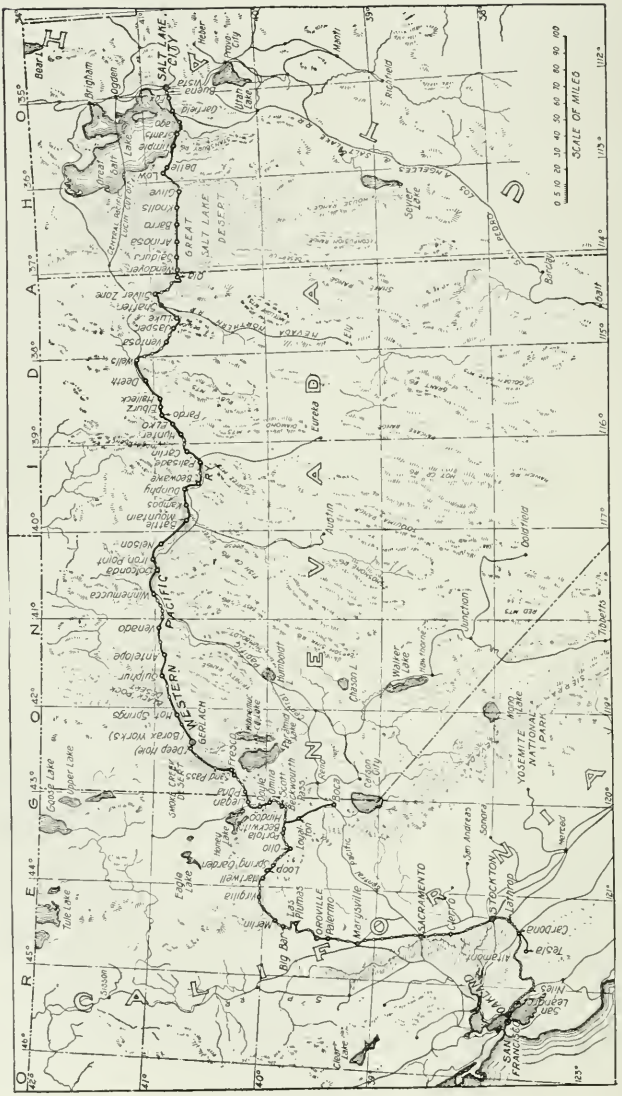
From the head of this A frame boom, six fold blocks were suspended to handle the girders, the fall being five-eighths plough steel wire.

We believe that this is the first time that this method of placing girders, riveted together and with deck complete, has been employed in the United States or anywhere else. We are quite sure that the dynamiting of the old structure never has been attempted heretofore.

* * *

Architects Shun Politics

POLITICS and education do not mix readily. It is not infrequent that men engaged in educational work find it unpleasant to continue their services when hampered by political control. As the result of the appointment of an ex-walking delegate of the Sheet Metal Workers' Union, Architect R. Clipson Sturgis, Chairman of the School House Commission of Boston, has tendered his resignation to Mayor Fitzgerald. Little blame can be attached to the architect for his refusal to serve as part of a political regime, when such an appointment belittles the office which he assumed with high regard for its artistic features. Similar action has been taken by Dwight H. Perkins, architect of the Chicago School Board, who also withdrew from his position on account of political interference. Such illustrations of the interference with the development of art and architecture in the public schools demonstrate the wisdom of separating our educational functions as far as possible from political manipulation. There are many good reasons why this should be done, but one of these is certainly to be found in the reluctance of good men to accept such positions or to continue in them a sufficient length of time to develop their own ideas in the work they undertake.



Map Showing Route of Western Pacific Railway

Wooden Stave Cylinders

Concrete an Important Factor in Building the Western Pacific Road

By F. C. WILLIAMS.

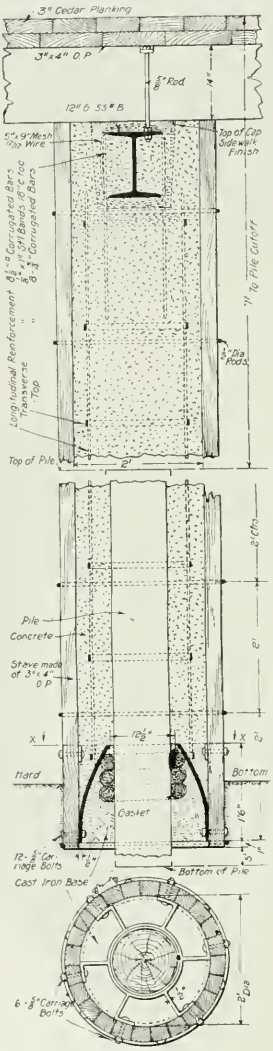
CONCRETE has taken its place in a very pronounced manner with buildings of railways, one of the most recent examples being the construction of the Western Pacific. This company has just opened its new transcontinental road from Denver to San Francisco and according to the engineers and builders concrete was an important factor in the construction work. Bridges, culverts and depots have been built of cement and it is said that had the concrete tie been perfected to the satisfactory point that it now is, it, too, would have been adopted by the company in preference to the wood tie.

The Western Pacific Railway ran its first transcontinental passenger train into San Francisco on Tuesday, August 23d. It was the occasion of an enthusiastic celebration by the inhabitants of practically every city and town touched by the new road.

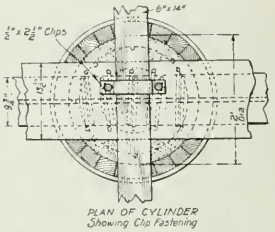
Besides being a notable engineering feat, the completion of the road is of particular interest to Architect and Engineer readers because it means increased population for the many towns through which the line passes, and with the added population there necessarily must come the construction of more substantial buildings.

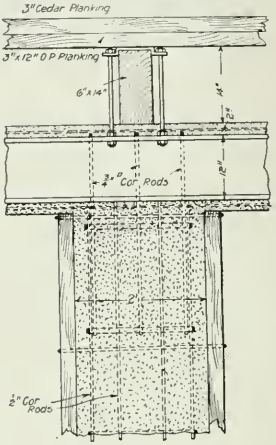
The length of the Western Pacific Railway, from Salt Lake City to San Francisco, is 927 miles, of which four miles, from the mole at Oakland to San Francisco, is ferry, leaving 923 miles as the length of the track from Salt Lake City to the terminal in Oakland. The length of the Southern Pacific (Central Pacific) road between these two points is 923 miles, of which 37 miles is the distance from Salt Lake City; over the Oregon Short Line Railroad, to connect with the Southern Pacific road proper at Ogden.

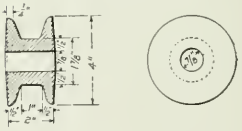
Starting at Salt Lake City and comparing distances by the two roads, the Western Pacific Railway is 11 miles the shorter to Winnemucca, Nev., the distance by the Western Pacific to this point being 395 miles. From here to the California line the distance by the Western Pacific is again shorter by about 40 miles than via the Southern Pacific. The Western Pacific Railway is, therefore, 51 miles shorter than the Southern Pacific road between Salt Lake City and the California line. Westward of the Cali-

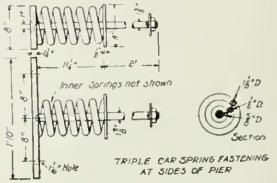


Section of Combination Wood and Reinforced Concrete Pile









Details of Pile and Pier Deck

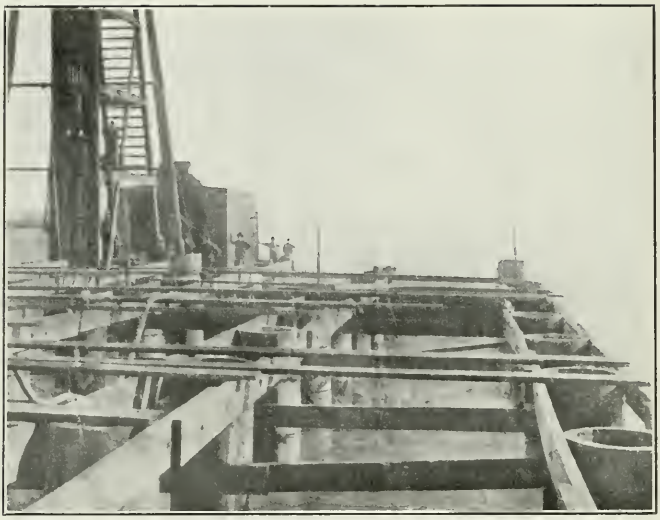
Cage-like Device of Reinforcing Bars and Bands for Concrete Piles

fornia line, as will be seen by the map, Figure 1, the Western Pacific Rail way is much the longer, being 60 miles longer to Sacramento and 98 miles longer to San Francisco.

Starting from Salt Lake City, at an elevation of 4224 feet above sea level, the route is directly west for a considerable stretch, and then slightly south of west to Garfield, 14 miles from Salt Lake City, where the road strikes the Great Salt Lake. From Garfield to Timpie, a further distance of 27 miles, the road skirts the shore of the lake, and, at the present stage of high water in the lake, the track for 8 miles of this distance is on a fill, in shallow water, at some distance out from shore. Figure 2 shows a piece of the road on this fill. The embankment throughout this 8 miles is filled with rock, to withstand the wash from the waves of the lake. When this part of the road was constructed the right of way was entirely dry ground, but owing to the heavy rain and snow fall in the mountains the level of the lake has been steadily rising for several years.

The grade on this 41 miles of line and for about three and a half miles further is practically dead level, principally tangent, the lowest point being at elevation of 4203 feet. About three and a half miles west of Timpie the grade begins ascending at 0.4 per cent to Delle, beyond which, for a distance of 12 miles, the grade increases to .8 per cent, reaching an elevation of 4632 feet at the summit, in a break between the Cedar and Lakeside ranges of mountains. From here the road descends on an .8 per cent grade at Clive, and at .3 per cent for 9.3 miles further to Knolls. From Knolls to Wendover, Utah, 39 miles, the road is again practically level. Wendover is just east of the Nevada line, and practically from this point the road begins ascending at 1 per cent, the maximum grade of the road, which continues for 33 miles, namely, to Silver Zone. Westward of this the grade is undulating for about 25 miles, at the rate of 1 per cent maximum, and then the grades become easier for a long distance.

At Bronte, 22 miles west of Gerlach, the road reaches the lowest point in Nevada, namely, 3854 feet, and then continues to rise (with the exception of about 9 miles of road), on grades of .4 to .8 per cent, to the summit of the Sierra Nevada mountains at the Beckwourth tunnel, where the grade again falls and continues to descend all the way to Pleasant Grove, a point 19 miles east of Sacramento. West of Sulphur, Nevada, the general direction of the line changes to a southwesterly one, crossing the California



Method of Constructing Pier, Showing Pile Cylinders Before Filling with Concrete

state line a few miles west of Puna. At Liegan, California, the direction again changes to south, for about 25 miles, to Scott, where there is another abrupt change in the general direction to slightly north of west for a distance of about 100 miles, to Merlin, California. Here the general direction again changes to due south, as far as Stockton, a distance of approximately 150 miles, where there is another turn to the west until the road reaches Oakland. From Marysville to a point about two miles west of the San Joaquin river, a distance of 102 miles, the road is practically level, when there is another ascent of 1 per cent westward to Altamont tunnel. The summit, 750 feet above sea level, is a little west of this tunnel, and from there the grade descends at .8 per cent, with a few breaks, to Niles, from which point westward the grades are undulating and varying from .4 to 1 per cent, to Oakland.

Between Salt Lake City and Oakland there are 43 tunnels, the aggregate length of which is 45,494 feet, or more than 8½ miles. The Pacific Terminal division has one, at Potrero, 1625 feet long; and the San Francisco division three, that at Niles (Tunnel No. 1) being 4287 feet long.

The track is laid with 85-pound rails, on fir ties. Tie plates are used on all curves and on all of the 1 per cent grades. Both Harris and Roberts tracklaying machines were used in the work of construction.

The ballast of the road is mostly fine gravel of excellent quality. As with a number of other Rocky Mountain roads, abundant deposits of the material are available at convenient distances. Through the Feather River canyon disintegrated granite is used for ballast to some extent. Hindoo laborers have been employed on the track in considerable numbers, as well as the usual admixture of southern Europe nationalities and hoboes.

For the passenger station buildings there are four standard plans and some special designs. For towns of population under 10,000 the stations are of frame construction, the exterior of the better class of structures being plastered with cement on metal lath. For towns of population over 10,000 the stations have concrete walls and there is one standard plan, but, for obvious reasons, special designs have been used for the largest cities. At small towns the passenger and freight stations are combined under one roof.

From Oakland to San Francisco all traffic, both passenger and freight, will be ferried over. For the passenger business the Western Pacific Railway will use two slips of the Ferry building, at the foot of Market street, which is owned by the State of California.

On the San Francisco side the company has ferry slips at the foot of Brannan street, with a small yard, and also at the foot of 25th street, from which there is rail connection with a yard at Ninth and Bryant streets. At the foot of Brannan street, Piers 34 and 36, the latter having a freight slip, were built by the Western Pacific Railway, under an arrangement with the state harbor commission by which the railway company will have use of the property for a term of years. Pier 36 is completed and Pier 34, 650 x 130 feet in size, is in course of construction.

The pile work of this latter pier is new and most interesting. The piles are a combination of wood and concrete, having a reinforced concrete shell 6 inches or more thick around the wooden pile, to protect it against toredo work and also to assist in the sustaining power. These piles and the method of driving and forming them are the invention of Mr. Howard C. Holmes, consulting engineer, and chief engineer of the San Francisco Dock Co., San Francisco, who is supervising the work. Mr. Holmes was for many years the engineer of the state harbor commission.

The Holmes pile consists of a wooden pile not larger than 12 inches in diameter at any part, driven in the ordinary way to a satisfactory depth, and then a hollow wooden cylinder, of 24 inches internal diameter, is slipped over the pile and driven to the same depth. This cylinder is water tight, and after it has been driven the water and mud are removed from the interior and a cage-like devise of reinforcing bars and bands, 18 inches in diameter, is slipped over the pile. The bars of this reinforcement, it will be seen, come about 3 inches from the inside of the wooden cylinder, all around. Next the space between the cylinder and the wooden pile is filled with concrete, which, as soon as it sets, forms a reinforced casing around the wooden pile.

More in detail, the bottom of the wooden cylinder is fitted internally with a bell-shaped cast iron shoe, opening downward. The upper part of this shoe has an opening 12¼ inches in diameter, or just a little larger than the diameter of the head of the pile. As the cylinder is driven downward the pile inside the shoe naturally becomes smaller, and to prevent, as far as possible, the entrance of mud into the cylinder, a gasket consisting of three turns of old rope is used under the shoe. Nevertheless, some mud usually does work up into the cylinder, and this is removed, before the water is pumped out, by running a 3-inch pipe to the bottom and pumping water down with great force. This stirs up the mud, and it is carried up with the rush of water and overflows at the top of the cylinder. The bottom of this force pipe is formed into a ring-shaped head, like a life-preserver for appearance, and it is perforated in the bottom at numerous places. There is thus a jet-like action, all around the pile, downward into the mud, so that the current flowing away from the head can have but one direction and that upward.

Some photographic views are presented to show the method of making and driving the Holmes cylinders. The staves are ripped from 3-inch plank and given the proper bevel in a planer, and are then assembled in forms, with an interior form for laying the pieces over the top; and are then hooped with round bars after the manner of making wooden flume pipe at power plants in the West. The nuts of the hoops are turned up tightly with box wrenches while the hoops are pounded vigorously with hammers. The reader will appreciate the necessity of having these cylinders tight enough to exclude water while the concrete is being put down. The staves are in a variety of lengths, so as to break joints, and in this manner cylinders of any desired length can be formed. In this pier cylinders 53 to 55 feet long were commonly used, and there were some much longer.

The cylinder is handled like an ordinary pile. After the cylinders have been filled with concrete, it is undesirable, of course, that there should be any swaying or lateral movement in them, and for this reason they are secured beforehand. It should be stated that the means of keeping the wooden pile as nearly concentric with the cylinder as possible while the cylinder is being driven, is by spiking four battens to the pile longitudinally, 90 degrees apart around the pile. These touch the opening of the cast shoe, all around, and thus keep the pile to center, or nearly so.

The method of constructing the deck of the pier upon these reinforced piles is shown in the illustrations.

* * *

Competition as Viewed by the Engineer

THERE is much in actual experience that would confirm the following editorial opinion of the "Engineering Record" in regard to the desirability and value of competitions for the purpose of selecting an architect or engineer to perform a given piece of work. To quote:

"Although architectural competitions are frequently used as a means of choosing architects or of securing preliminary designs, it is very doubtful whether this method is conducive to best results. Engineers are comparatively free from this practice except in the design of some structures such as small bridges. A few years ago when an engineer submitted a plan for a bridge he was very apt to find himself in competition with one or more bridge companies, but now, even in this branch of engineering, it is common practice to employ an engineer who prepares his own designs which are then submitted to bridge companies for bids. Architectural competitions are generally of no advantage to the owner. To make them successful he must first choose an adviser, whose duty it is to formulate the terms on which the competitors must base their designs and to conduct the competition. The American Institute of Architects has given this matter considerable attention, and under the code of that society it is unprofessional for any member of the institute, or, of a chapter thereof, to participate in a competition, whether as competitor or as juror, unless the program shall first have been approved by the committee on competitions of the Institute or by an authorized sub-committee. A contest of this kind is a slow and expensive process of choosing an architect, and in a great majority of cases it would be much better if he were chosen directly and solely upon his fitness to design and superintend the work. It is possible that a competition may bring forth a meritorious general design for a building, and the author thereof be so entirely lacking in executive ability and in the technical knowledge necessary to prepare detailed designs as to be incapable of carrying the work to successful completion."

Ruminations and Cogitations

By F. W. FITZPATRICK.

A RATHER extended trip throughout the West has demonstrated to me that a certain detail of our architectural practice has been very much emphasized within the past few years. It has always been a very sore point with the brethren, particularly those of the far West and South, that the very big jobs in their localities so often went to the architects in the bigger cities, generally Eastern men. But lately it would seem that this habit had become far more pronounced and that it was not only the biggest of jobs that drifted away but very many of the rank and file. The average man with a bank or office building or very fine residence to build apparently travels around the country a bit, sees something that pleases him and gets into touch with its architect who eventually plans his building, much to the disgust and distress of the local architects who feel that that building rightfully belongs to them and who, in many cases, actually contribute toward its erection. This has become a fashion. In many cities the local men have to be contented with the most insignificant or local stuff and the better class of work from the tributary smaller places, towns and villages. The greater part of the work in these cities goes to the architects of nearby bigger cities while the work in these is carried to still bigger cities and so on till you get to New York. There they have not yet gotten into the notion of going to London but the scheme seems to reverse itself and many fellows from Chicago and Philadelphia and such cities are actually breaking into New York practice. It's a queer, unrestful condition.

In the final analysis there really is little sense in it. Apparently it all hinges on the artistic side of the affair, the question of design. But right in that line you'll find that most of the bigger architects are essentially executives and dabble very little in the really architectural part of the work. This is handled by clever assistants. These chaps ultimately move away from the bigger centers and get into practice for themselves. They have designed and handled some of the best and biggest work in the country, yet their local towns-fellows seem to be afraid of entrusting them with their less important work, and this is handed over to the very men who depended upon them for designing the buildings that have given them their big reputations.

I for one firmly believe in what might be called "home-rule." Particularly in public work. The architects certainly contribute their part in the way of taxes, etc., and the act of living in that place, expending their earnings there, would seem not only to justify but to make it mandatory that that work should be done by them. Of course it is always an owner's privilege if that owner be an individual or a community if he believes the local architects to be not quite up to the exalted state he deems necessary for the local designer of his building to have them associate with some big gun from elsewhere, but in every case that big gun should simply be a balance-wheel or an accelerator of the artistic and the local architect should control the work, get the major credit and be IT on that building. It is just as sane to ignore the mayor of a city for instance, and have the council of that city presided over by a mayor from somewhere else. This too, might, when you come to think of it, have its advantages but it would hardly be the proper caper.

This craze for "strange gods" as it were, has its amusing side. I happened to stumble onto a case the other day. A good big hospital was in question. The principal local architect had built three very good and quite as important hospitals. He is a prominent man and had contributed liberally to the city's welfare so he was given the job but had to be hitched up with a "specialist," an architect from a bigger city who is quite a fellow socially and knows how to pull in the chestnuts but, as it happened, has never had a thing to do with a hospital. Yet he is supposed to make the plans while the local chap will merely superintend the work. I wonder if he will be man enough to correct the bungles or if he will just gloat over the errors of his specialist associate.

All this is having a marked effect upon general practice and it seems to me, is bringing the latter just a little nearer to what I have prophecied years ago, the ultimate extinction of the profession and its absorption into construction companies, institutions doing the whole thing on a building, designing, constructing, furnishing, everything, and these so merged and boiled down that there will be but a handful of big, heavily capitalized building companies that will finance as well as construct.

In some cities there are architects handling quite a large practice and with not one blessed local job on hand. Other men who dislike to travel and handle these outside affairs are drifting out of architecture. During this very trip five, and not small fry either, have asked me to put them in touch with some means of effecting just such an organization as I have always had in mind, a constructing company, embodying architect and all and, mark you, this was not suggested by me to them but came from them spontaneously and as a result of their disgust with the architectural practice as it has become.

It seems to me that our Western and Southern confreres would take time by the forelock and kind of head off what apparently is inevitable by catering to the fashion and voluntarily going into association or partnership with Eastern firms or individual practitioners. All Western banks have Eastern "correspondents"; why shouldn't architects be similarly equipped? Wouldn't it be much better to do that voluntarily than to be whipped into it in order to get a job?

* * *

WE SOMETIMES growl about architects being under-paid and we read a good deal about the wonderfully top-notch prices paid for literary work by high-toned literati. Much ado has been made about Colonel Roosevelt's one dollar a word. Well, here's a case where an architect, think of that, an architect! has touched high-water mark in the way of literary prices. My story will also illustrate the point that I have often made in these pages and elsewhere that most of us are prone to give the client too little for his money, that we lack preparation and thoroughness in our work and that it is our own fault if the building public gets disgusted with us every once in a while and goes beating around the bush trying to find some surer and safer and less mistake-ridden way of doing things.

Time, the present. Place, one of the principal cities in the South. A serious dispute has arisen between architect and contractor as to the execution of a certain detail of work on an important building. It is work that could not be shown by any drawing and had to be covered by specification alone. It is a very vital detail and deserved most exhaustive treatment in the specification. It did not get it. A row followed. The archi-

tect wants the work done a certain way, the contractor refuses to do it so. Under the specification he is not required to do it that way and it is not reasonable to suppose he would have figured it that way. Experts in arbitration have been tried but to no avail, for the case will certainly go to court and I'll bet anything the contractor will win out and the owner will have to pay thousands and thousands of dollars extra. And all because Mr. Architect valued his time so highly he couldn't be bothered writing much about it. The item, as I say, was important. He covered it with 230 words. There was no drawing or superintendence, just that part of the specification did the whole business—it was an item that involved $96,000. He gets 5 per cent on that, $4,800. That amount for 230 words means $20 a word. I call that pretty high-priced literature.

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Window Boxes

PEOPLE who love flowers need not be deterred by lack of ground space. Wonders can be done in boxes, and these boxes can be fastened to every window in the house, to porch rails or may be stood on legs close to the house or along the curb—if city authorities permit.

Though you are that semi-homeless being, a flat-dweller, you need not be robbed of your "blooming things" provided you can win over the janitor. The roof affords ample opportunity for a garden; even the unsightly chimneys may be made things of beauty with morning-glory and moon-flower vines springing from flower-filled boxes at the base.

We Americans need to take a trip abroad to see what can be done with flower boxes: the English workingman will convert his two-roomed cottage into a veritable bower, and the streets of Paris are gay with window and porch gardens.

The window and porch box need not be a costly experiment as many women think, says the Danville Democrat. If you have zinc-lined tiled receptacles for your plants and have them put in place by carpenters and filled several times a season by professional florists, your pocket-book is bound to suffer.

If you really love flowers, the box will matter less than its contents, and anything will answer from an old butter firkin to a scythe box, to be bought for a few cents at a hardware shop.

With hammer and nails, a few old boards, and a coat of paint, each window and your porch railing can be furnished with good-looking boxes at only the cost of hard work and pounded fingers.

Flower-boxes ready to put up can be bought for less than if made to order, but where many windows are to be converted into gardens it is wiser in the end to hunt a carpenter who will work by hour or day, and have him fit the boxes to your spaces. As, like good window screening, these boxes last for years it pays to have them done right in the beginning.

To make window or porch boxes more sightly they should be painted to correspond with the woodwork of the house, or, if that is white, the boxes may be a rich dark green.

The most suitable size for such boxes is ten or twelve inches wide and deep, and the full length of the wondow casing on the outside. As when filled, the weight is considerable, see that each box is well girded or you may be liable for serious accidents.

When not sure that your carpenter understands his business, insist

upon your wondow-boxes being made of inch-wide boards fitted closely to prevent the sides warping.

Some gardeners insist upon half a dozen holes bored in the bottom for drainage, but a better plan is to have a hole at the bottom in the place where it is most conveniently reached. This can be provided with a plug to a wire to let it be pulled out easily.

Such an arrangement will get rid of surplus water during rainy seasons, but will not let so much run off daily as to wash out the soil. Drainage is important in successful box-gardening. There should be a layer of broken crockery on the bottom of each box. If charcoal is mixed with it the soil will keep sweeter. Be sure there is a good sized piece of crockery over the drainage hole to keep it from being clogged with dirt. This is placed on inside of box with curved side up. A zinc tray is fit inside the box; it can be ordered from the tinsmith. It is useful to keep the soil from drying out so rapidly but is not necessary.

Soil for box-gardening must be richer than if the same plants were to be grown in the garden. The best soil is porous and springy, one that neither packs hard like clay nor contracts too much when dry.

Potting soil sold by the florist for a dollar and less a barrel is excellent, or ordinary garden soil mixed with sharp sand and enriched with well-rotted manure.

Fill the box within an inch from the top. A successful box gardener advocates having the soil a little higher at the sides than in the center. This tends to prevent shrinking of the earth from the sides of box, thus leaving a channel for water to escape without wetting the soil properly.

One secret of a successful box-gardening is plenty of water. Being exposed on all sides rapid evaporation takes place and the soil soon dies out. Dribbles with a watering-can are almost worse than nothing. The soil must be thoroughly soaked daily; twice a day in hot weather.

The best time to water window boxes is early in the morning before the hot sun has gotten around to them. Another thing to be considered is the amount of root space. Many boxes are ruined by overcrowding. Better grow fewer plants well. They should be set from six to twelve inches apart, according to size. For the ordinary window-box, six erect plants and four vines are sufficient.

What those plants are to be depends upon exposure, individual preference, and the amount of care that can be taken. It is too complicated a subject to be tacked to the end of a window-box story and must be left to the discretion of the owner.—The House Beautiful.

* * *

Sand for Concrete

In discussing this question before the Boston Society of Civil Engineers, Mr. J. P. Snow states that a good criterion of cleanness of sand is the freedom of its grains from sticking together.

The sand may be coarse or fine, but if each grain admits of being wholly covered with a film of cement, the mortar will have the strength of the cement. If, however, several grains adhere together strongly enough so that they are not separated by the process of mixing the mortar or concrete, it is evident that the spot in the mass where this lump is will be no stronger than the lump itself. The material causing the sand to stick together may be clay, a film or silt, organic matter, oil or chemicals, but if effective enough to hold the grains together till the concrete is placed, it will cause a weak nucleus in the material. A magnifying glass will greatly assist in determining the qualities of sand.

Paints for Concrete and for Embedded Steel

By ERNEST F. BURCHARD.

THE use of Portland cement concrete for structural purposes has already become world-wide, and it is increasing at a rapid rate. Heretofore little attention has been paid to coatings for concrete. Enough time has now elapsed to show that cement concrete alone is not so durable as might be wished, partly because it is not wholly waterproof, and partly because the cement either contains free lime or develops free lime within itself after setting. Furthermore, concrete, in order to compete with other structural materials, has had to be economically handled and roughly finished, and its resulting unsightly appearance has detracted from its desirability. It is therefore clear that there is great necessity for both protective and decorative coatings for concrete. The problem of waterproofing concrete is being studied from several standpoints besides that of applying protective coatings. For instance, endeavor to reduce the voids in concrete to a minimum as well as to obtain uniformly finely ground cement and to eliminate the tendency of the cement to form free lime in setting, are all absolutely necessary steps in the production of a waterproof concrete and are the special problems for the manufacturer of cement and the engineer of construction to work out. Much experimental work is under way with regard to waterproofing concrete by means of the addition of various foreign substances in small quantities to the aggregate. Some of these materials are of mineral composition and others are organic. Many compounds are now on the market, but the composition of most of them is not published. Some analysis have been made by the scientific section on a series of compounds widely advertised for use in waterproofing, strengthening, or decorating concrete. Among the materials contained are stearic acid compounds, gums, waxes, soaps, minerals, chlorides, inert pigments, and asphalt derivatives. Much interesting information is given regarding the composition of such compounds, although the names of the particular compounds are not given. The possibility of ultimate deleterious effects on concrete from the use of these internal waterproofing materials is a subject for joint study by engineers and paint chemists. In addition to proving the advantages of such materials as water excluders, it should be determined whether or not they may corrode the steel used in reinforcing concrete, and whether or not they may affect the set and tensile strength of the cement itself.

It is particularly the province of the paint chemist to study the subject of paint coatings for concrete. Oil coatings have been found to be badly affected by the free lime present, which causes saponification and subsequent solution of the saponified coating. The porosity of cement or concrete surfaces causes an absorption or suction effect that renders it necessary to apply to a given area three or four times as much paint as would cover an equivalent area of wood. Two very important lines of investigation are therefore suggested, the neutralization of the free lime in the cement and concrete, and the proper filling and treatment of the pores of the concrete in order to prevent the suction of any paint that may be applied later. One suggestion that promises to be of great importance in both of these lines has been made by Charles Macnichol, a master painter, of Washington, D. C. Mr. Macnichol suggests that a solution of zinc sulphate and water mixed in equal parts by weight (8 pounds zinc sulphate to 1 gallon of water) be used as a priming coat. When applied to concrete surfaces a reaction between the zinc sulphate and the free lime takes

place, in so far as the material penetrates the concrete. The products of this reaction are calcium sulphate and zinc hydroxide. There are thus precipitated into the pores of the concrete two practically insoluble pigments, both neutral, and these tend to fill the voids and pores and thus to lessen the suction properties of the concrete, besides having neutralized the free lime in the cement. After the application of this priming coat, oil coatings may probably be applied with good results, although whether or not an excess of zinc sulphate in this treatment may do any harm has not yet been determined.

* * *

A Record Production of Structural Steel

STATISTICS recently published by General Manager James M. Swank of the American Iron and Steel Association show that the production of structural shapes in the United States in 1909 was 2,275,562 gross tons, or more than double the total for 1908. Low prices for fabrication last year and the low level to which mill prices also fell stimulated construction, so that a new record was made. The greatest output previous to 1909 was in 1906. The statistics embrace beams, beam girders, zee bars, tees, channels, angles and other structural forms, but they do not include plates, girders made from plates, or bars for reinforcing concrete work. Of the total production in 1909 about 2,230,748 tons was rolled from steel and about 44,814 tons from iron, against about 1,080,758 tons rolled from steel and about 2,423 tons rolled from iron in 1908. The production in 1908 and 1909 by states was as follows in gross tons:

	1908.	1909.
New York and New Jersey	86,044	177,483
Pennsylvania	810,146	1,642,074
Tennessee, Alabama and Ohio	31,287	60,213
Indiana, Illinois, Wisconsin and California	155,704	395,792
Totals	1,083,181	2,275,562

The following table gives the production of structural shapes from 1892 to 1909. Prior to 1892 structural shapes were not separated from other rolled products in the statistics:

	Gross Tons.		Gross Tons.		Gross Tons.
1892	453,957	1898	702,197	1904	949,146
1893	387,307	1899	850,376	1905	1,660,519
1894	360,305	1900	815,161	1906	2,118,772
1895	517,920	1901	1,013,150	1907	1,940,352
1896	495,571	1902	1,300,326	1908	1,083,181
1897	583,790	1903	1,095,813	1909	2,275,562

* * *

"How pleasing it must be to sit before a blazing fire while the wind vainly rages outside."

"Yes," answered Farmer Corntossel, "I s'pose it would be right pleasant."

"Why, you ought to know. You live in the country."

"Yes, but I ain't the feller that sits by the fire. I'm the feller that fetches in the wood."—Washington Star.

Again—The Woman Architect

From London Building News and Engineering Journal.

THE appearance of an advertisement in our issue of last week for a lady assistant in an architect's office, the first of the sort which we remember to have seen, brings into prominence again the old question of woman's place in architecture. That many walks of life which were formerly followed entirely by men are now filled, with more or less success by members of the other sex, is accepted as one of the signs of that general progress of which so much is talked about. Any observer who looks beyond the mere surface of things must recognize that a great change is coming over the human race, particularly in the more civilized countries. Amongst elemental peoples it is a universal rule for the women to work, and for the men to act as warriors and protectors. This has been so from the earliest time, and is still the condition of affairs amongst all savage races. When in the course of evolution there came to be less necessity for the warrior or defender, it was the man who took up the harder work, and because he had ruled with a strong hand while he was little else than a fighting machine, he still continued to do so. He took to himself all that was best and left only that which was more of the type of drudgery to his female relatives. Then followed a period when, at least among the more wealthy the men delighted to labor that their women folk might live at ease, till they came to be considered unfit for work. In some countries it has more recently been necessary to revert to the original state of things. In France, for example, where the population is decreasing, and where a large country has to be held against foes who surround it on all sides, the rule of army service is so strict, that practically the men have again become the fighters and the women the workers. They undertake tasks which in England are unheard of. To a certain though to a less extent this is the case in Germany also, where it is by no means an uncommon sight to see a woman carrying a hodful of bricks up a ladder, or drawing a plow with an ox for company, while the shafts are held by a man. In England the tendency is toward the invasion by woman rather of the higher branches of man's work than the lower. The women do not incline to become common laborers, undertaking muscular work which men can better perform; but they are certainly taking on a large number of tasks, where mental adaptability is of more value than muscle, which, until comparatively recent date, were performed by men alone. They have shown, too, that in many respects they are the equals if not the superiors of those whom they have replaced. When many of us who are only yet in middle age were serving our articles, the lady clerk was unknown; she is now found everywhere. Her employment frees a large number of men, enabling them to go out and do what is more truly man's work, as colonists or pioneers, or workers in the open air. It has not merely freed them, but has compelled them to do this. On the other hand, on a somewhat lower grade, women will not perform tasks which they used to be willing to undertake. Many a man now finds difficulty in obtaining work because, as he says, he is ousted by women from positions which he used to occupy, while the women's work of the home and the nursery is left undone. At any rate, it is clear that the unskilled laborer among men has a very great deal of difficulty in finding employment, while the unskilled laborer amongst the women can obtain it readily, in service if not elsewhere. What this state of things means is exemplified by a somewhat startling letter which appeared in a daily paper (only a few days before we printed an architect's advertise-

ment for a lady assistant) from a man who was out of work, saying that he was desirous of taking a housemaid's situation!

Looking at these things broadly, it is not to be wondered at that women who have a liking for drawing should be somewhat fascinated by the work of an architect's office. If they can take down the letters and specifications in shorthand, and render them upon the typewriter, surely (they may argue with considerable reason) they are capable of making satisfactory tracings, and of doing the other ordinary work which they see being carried out by the male assistants; and not only are they themselves willing to undertake the work, but it is quite conceivable that many a principal would be agreeable to employ them thus. It may very well happen, in fact it does happen in many cases, that a principal requires assistance both in the clerical and drawing departments of his business, but that he cannot afford to employ two persons. He very possibly has only enough work for one. If the same person can act both as stenographer and tracing-clerk, so much the better. Years ago it was quite a common thing to thus employ a male assistant, to make drawings when drawings were needed, and also to write specifications and to take down and transcribe the letters, or, at any rate, to copy them; for shorthand was by no means so greatly used then as now, the letters being as a rule written by the principal's own hand. Now that the latter work is almost entirely done by ladies, the architect may very well reverse his procedure, and instead of employing his draughtsman occasionally as a clerk, when pressed in that department, he is now inclined to use his stenographer as a draughtsman.

All this indicates an almost inevitable development which must have a great effect eventually upon the ordinary method of conducting an architect's business. As a matter of fact, work at the drawing-board is exhausting; it must almost necessarily be done standing; and to lean across the board for hours at a time while working at the top of it strains the body considerably. It is hardly work for which a girl is fitted. All the same, it seems as if this consideration is not likely to carry great weight (though it should do so with all who consider the health of the girls who wish to take up architectural work) and that the girl tracer is likely to become quite common. For a long time past the tendency has been to reduce the number of better-class assistants in an architect's office. Working drawings, as they used to be understood, are rarely now prepared, but good, clear sketches are made in pencil by the principal and are then traced by an assistant, any subsequent copies being obtained by sun printing. An intelligent woman, under efficient supervision, should soon be able to do this sort of work. The army of male architectural assistants would then become smaller than it is at present; and it is already very much less numerous than it used to be. Now, an assistant in architecture is remarkably badly paid. It is generally impossible for him to be given such a salary as would enable him to provide properly for wife and family. The introduction of the female assistant would still further tend to reduce salaries, except in the case of the really first-rate man who could take his principal's place in case of need. For such there is always room, but only in the bigger offices. Young men, once they have passed their pupilage, would be forced to start in practice for themselves, and they would become employers of female labor. The final result would probably be that only the more competent would survive the test, and that a very large number of young men who are trained for architecture would eventually drift out of that calling into something for which they are better fitted; and this to their own personal

advantage, there being few positions more hopeless in life than that of the architectural assistant who can never rise to be his own master.

At this stage it would behoove the young man to expect competition even as principal from those of the other sex, for amongst any large number of lady tracers and draughtswomen there would surely be a few who would prove themselves man's equal in design, and even in supervision. A little while since we heard of a lady typist whose great ambition it was to become a clerk of works! This is unusual, but already there are several acknowledgedly well-trained lady architects, either in practice for themselves, or very nearly ready to open offices. In medicine, literature, and art, women have shown themselves, in exceptional instances, quite the equals of their ordinary male competitors; and while they have very rarely if ever done anything absolutely as good as the best work done by the men, they are at least thoroughly competent, and perfectly reliable. If this has happened in almost every other walk of life in which mental power and artistic taste have stood for more than mere strength of body (though the cases of Semiramis and Joan of Arc, to say nothing of our own Boadicea, show that woman can, on occasion, take man's place, even in warfare, and that with great distinction), there is every probability that she will do the same in architecture. She may not, even in rare instances, prove equal to designing such buildings as the Palais de Justice at Brussels, or our own Houses of Parliament; but she may very well perform the functions of an architect in ordinary general practice, and perform them well. The prejudice against the employment of women is so rapidly disappearing, that while nobody would have thought of going to a lady architect for advice ten years ago, it is quite conceivable that a good many, particularly lady clients, would prefer to do so now. The risk is perhaps that they might not be absolutely practical in their work, partly because of the obvious difficulty in the way of giving them practical experience upon buildings in progress, and also, possibly, on account of that same feminine desire for prettiness without mastery of detail which produces so many women artists who have a fine sense of color, but no knowledge of perspective; yet this is a matter which tolerable training ought to overcome, as it unquestionably has done in some instances already.

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The Work of Reid Bros.

The work of one of the oldest and best known architectural firms in San Francisco—the Messrs. Reid Bros.—will be illustrated in the November Architect and Engineer. This firm designed such notable structures as the Claus Spreckels building, the Fairmont hotel, the band stand and stadium in Golden Gate Park, the Hewes building, the Yeon building in Portland and many other equally pretentious piles. Many full page plates and details of buildings will be shown and no pains will be spared to make the number of unusual value to the members of the profession.

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Los Angeles Architectural Club

The annual meeting of the Los Angeles Architectural club was held the first part of this month, at which the following officers were elected: President, John J. Frauenfelder; Vice-President, Frank L. Stiff; Treasurer, Otto Janssen; Secretary, H. E. Bean. Fifty-three new members were elected, making the present membership of the club 175.

Advantages of Brick in House Building*

IN MODERN building conditions brick construction is in many instances as cheap as wooden frame houses, and in nearly all cases the difference is so slight that brick is preferable. Another point in favor of using brick for house building is the much greater durability of this material, its cheaper cost of repair and up-keep and the superior fire-proof qualities. The cost of lumber has steadily advanced in the past ten years, and at the present rate it will soon become almost prohibitive as a common building material.

As a result of these conditions the use of brick on a larger scale than ever must become an important factor in the building trades of the future. Builders and architects formerly confined their attention for brick construction chiefly to town and city houses, but today there is a steadily increasing demand for country brick houses. Manufacturers of brick have helped along this movement by improving the variety and quality of their product, so that a greater architectural variation can be obtained. Architects dealt chiefly in wood because it was the cheapest material, and they were more accustomed to making designs for wood. But the day of shoddy architecture for country houses has passed, and our homes are made more dignified and solid by leaving out the flaring ornaments which wood produced.

A plain square colonial brick house, with two or more varieties and colors of brick produces today the most harmonious effects in country architecture. The white-faced, buff and red brick give sufficient color to the walls to break any monotony that might seem apparent with only one variety. Furthermore, the different sizes of the brick enable architects to create more pleasing designs than ever before.

The style in building material changes with the change of fashion and demand. The present high price of lumber has stimulated builders and manufacturers to exploit many new materials to meet the new conditions. It is this more than anything else that has given terra cotta fire-proofing block their present popularity, and by the same token glazed brick and tile are rapidly increasing in use. Variety is needed in building material, and there is room for all of these manufactured products.

But we are beginning to build much better and more permanent houses than formerly. The country was first built up with cheap, wooden houses, and the temporary nature of many of these has called for the complete rebuilding in recent years of whole towns and cities. The disappearance of the frame houses in our cities is but an indication of the movement. Next they will disappear in the country, and houses of more substantial material will take their place.

Some recent comparisons of houses of brick and frame have been made to show that a man could build a substantial home of brick for almost the same price as of wood. The contracting builder is frequently confronted by the question of cost of these two types of houses. The owner prefers a house of brick which will last longer and prove more serviceable in the long run, but he is not always willing to put the extra money into it.

Yet the relative difference between the cost of a brick, brick veneer and frame house is so slight that when we consider the other features the advantage is greatly in favor of the more substantial structure. Take the matter of repairs alone. A frame house requires painting every third

*By courtesy of the Building Brick Association of America.

year in even high and dry climates, and along the coasts the rule is about every second year. Indeed, when exposed to strong salt air, parts of the building must be painted every year in order to protect the wood from premature decay. The cost of painting an ordinary house runs from $60 to $150, according to the cost of labor and quality of materials. In spite of such close attention to the painting, parts of the frame exposed to dampness, such as steps, piazza posts, sills and foundation beams will require renewing frequently. A carpenter would charge on the average $50 a year to make such annual repairs. In other words, one must invest annually from $75 to $150 to keep a wooden structure in good condition. Against this what do we have for the brick house? There is practically nothing to do to protect the brick, and if properly laid there should be no renewal of the brick for decades. Within five years the extra cost of upkeep of the frame house will be more than double the difference in the cost of the two types of houses.

In building of brick it pays to use the higher grade products, and then to give special attention to the foundation. An insecure foundation will make the walls bulge and crack, and then your brick house is doomed to early decay. Half the trouble with brick houses comes from improperly constructed foundations.

Brick manufacturers are interested in making houses constructed with their material popular and also in influencing builders and architects to make the best of their opportunities. The public is often in ignorance of the actual value of different building materials and accepts without question the recommendations of architects and contractors. A great many would prefer brick or semi-brick houses for their country homes, but they are deterred from it because of the idea that brick costs so much more than lumber. While this was true a quarter of a century ago, it does not hold today. Conditions have changed, and the public needs to be educated to an appreciation of the change.

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A Renaissance in Brickwork

JUST now in America we are at the beginning of a period not only of extraordinary activity in all the creative arts, but also of a Renaissance in industrial art conditions. In common with other nations, but to a greater degree, this country has been suffering from that "blight of perfection" which had birth in the Victorian era and which spread for over a generation through all phases of existence not only in England but in America. This blight was particularly serious throughout the artistic world, preventing individual expression of beauty all along the lines of the fine and industrial arts. And, because of our progress in science in America, and hence greater productivity of machinery, the blight increased until art achievement in every direction was positively paralyzed. Our pictures and our sculpture became the slickest (to use a good old Yankee word), most highly polished exhibition of trivial imitation; our houses inside and out were overfinished and overfurnished and without personal interest; our clothes were all an overfine imitation of something which we thought better; our woods were varnished and veneered out of all beauty and naturalness; our brick were painted, or hidden under smooth cement, and so on through every last ramification of our artificial, highly polished, disingenuous civilization.

Now, at last, we are reacting from this. In common with other nations we are discovering that we have been in the grip of a strange aberration, worshiping false and foolish gods; that there is no such thing as a perfection of beauty; that in truth there is only ever-increasing beauty, as there is an ever fresh, varying expression of individual understanding of art.

In truth, the life of art and its varying expressions depend only upon the extent to which the people of a nation have opened thir minds to the inevitable inspiration of their surroundings, and have added to understanding the trained eye and the technical hand.

What we have been calling perfection, then, through these last few decades, was merely a degradation of the imagination, a blindness of the eyes, and a forgetting that individuality was the very cornerstone of art achievement. But today again that quality known as texture, which expresses the varying individuality and interest of the creator, which has always been in the past vital to beauty, is becoming a final standard in industrial achievement. And so when we speak of the Renaissance in brickwork, we mean that here in America, at least, we are again considering brickwork as an art, and brick as a material with which to emphasize those pleasant sensations of color, line and proportion shown as artistic effects; and we are ceasing to think of it as an uninteresting product of clay, a sort of artificial stone, to be used where the builder could not afford granite or marble or some other real material, a dull, commonplace, poor relation, to be thought of only as a substitute, not in itself desirable where impressiveness and beauty were being sought.

Now, back in the Victorian period some such careless definition of of brick and its uses might have been accepted without comment, and yet even then had any of us stopped to review the actual history of it as it can be read in museums, in ruins and in Oriental and Continental architecture, we would have realized the possibilities of brick, for in those early days builders knew its value and used it nobly and lastingly. Possibly it has been a study of those conditions which has brought about this Renaissance of brickwork, and which has inspired our manufacturers to create a new enterprise and to develop a modern brick which should rank as a culmination of the history which begins back in some of the most noble architecture of Egypt.—The Craftsman.

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Joke on Druggist

Two old cronies went into a drug store in the downtown part of New York City, and, addressing the proprietor by his first name, one of them said:

"Dr. Charley, we have made a bet of the ice cream sodas. We will have them now, and when the bet is decided the loser will drop in and pay for them."

As the two old fellows were departing after enjoying their temperance beverage, the druggist asked them what the wager was.

"Well," said one of them, "our friend Beorge bets that when the tower of the Singer building falls, it will topple over toward the North river, and I bet that it won't."—Everybody's Magazine.

Specifications—How They Should be Written

A SPECIFICATION is defined as a definite, particularized and complete statement—the written document in which engineers and architects describe those portions of proposed work which they cannot clearly show by diagrams. In addition, they are expected to specify the material and quantities required, and, with this, the manner of carrying out the work.

How many specifications drafted by engineers come up to these requirements? Frequently they are not worth the paper they are written upon, being so one-sided that they could not stand in a court of law, and being so unreasonable that even the engineer himself would not think of requiring the "pound of flesh," which might be exacted under the letter of the law.

The specifications should be both definite and exact; then the engineer not only fully understands what he requires, but where, in addition, he expects to enforce its carrying out. Engineers fancy that they are able to shield themselves behind a host of unreasonable clauses should a mistake be made. The client must pay for these unreasonable requirements, and the engineer who inserts them places himself in an unfavorable light before the contractors—the men who do the work and are in a position to judge of the necessity of each and every clause.

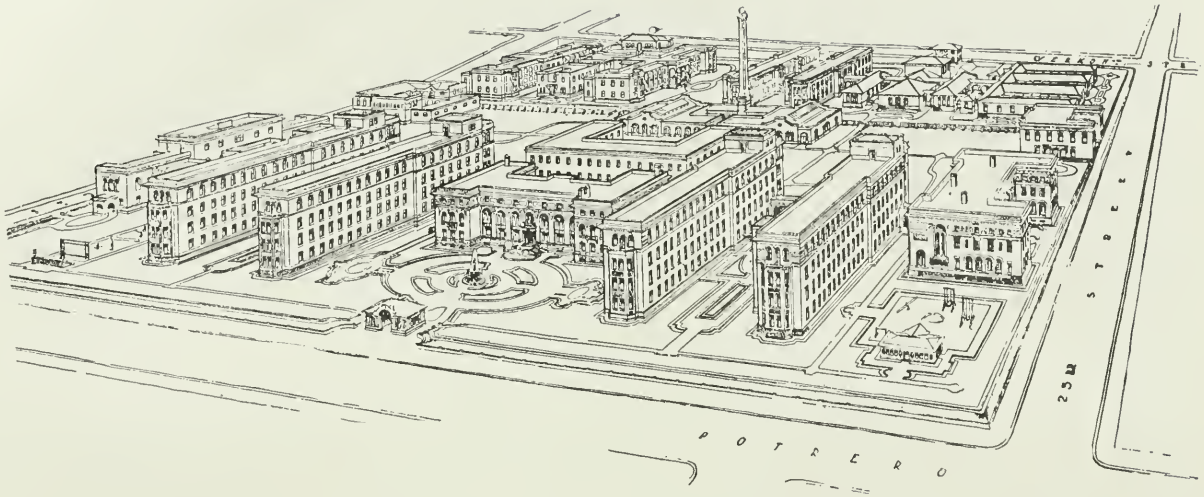
The insertion of such a clause as "All works are to be done to the entire satisfaction of the engineer. He is to be the sole judge of the work or material, both of quality and quantity, and his decision only on all questions of dispute with regard to work or material, or as to the meaning of interpretation of plans and specifications, is to be considered final and binding on all parties," are among the most difficult to understand. Why the engineer who prepares the specifications, and who is a client's representative, shall be the sole judge or referee or arbitrator in matters of dispute between himself and the contractor it is difficult to comprehend.

The engineer requires certain work to be done. The contractor, for a price, is willing to do the work. They both are agreed with the drawings and specifications covering the work required. It is unreasonable to expect the contractor to be satisfied in matters of dispute between himself and the engineer, with the engineer acting as sole referee. We would be surprised if such a clause would hold in a court of law, and we cannot understand why engineers persist in inserting such clauses in the specifications. Their only purpose seems to be to make ridiculous the other well-framed and necessary clauses. Such a clause as this places the men who make the drawings, prepare the specifications, the contract and issue the progress estimates the arbitrator in matters of dispute. Is this fair to either engineer or contractor?

It cannot be, since no contractor has any idea of abiding by this stipulation, should dispute arise.

But this clause undoubtedly keeps a number of contractors from tendering on work where they are not personally acquainted with the engineer or architect. This reduces the number of tenders considerably, and places the work practically in the hands of the friends of the engineer, which is frequently not good business, either for the client or the engineer.

The wording of specifications and the preparation of drawings and designs for the purpose of securing what is required and the statement of what the contractor is expected to perform should be prepared in such a way as to place all contractors upon the same footing. Nor should they be so stringent as to eliminate competition.



Birdseye View of City and County Hospital, San Francisco *Newton J. Tharp (Deceased), City Architect*

Home of Truck No. 1, San Francisco Fire Department

San Francisco Municipal Buildings

IN SPITE of the fact that there have been no less than four changes in as many years in the head of the City Architect's office in San Francisco, the department has gotten out some very creditable work. Some of this was commenced by the late Newton J. Tharp, who was appointed to the position soon after the fire. Among the notable structures begun under Mr. Tharpe's administration was the Hall of Justice, now nearing completion, and the City and County hospital, the latter, one of the largest and most modern hospital buildings in the world. The accompanying illustrations give a fair idea of the immense size of the hospital and they also show what the Municipal Bureau of Architecture has accomplished in the construction of fire and school houses.

The City and County hospital buildings will, when completed, represent an outlay of something like $2,000,000. The site is 866 by 760 feet and the plans call for three main buildings—a general hospital, a hospital for the treatment of infectious diseases and another for tubercular patients. In addition there will be a power house, laundry, morgue and ambulance sheds and stables.

The Italian Renaissance style of architecture was followed by Tharp in designing the buildings, which will be of brick of rich color with terra cotta trim. The grounds will be laid out with lawns, and bright flowers will add to the attractiveness of the structures.

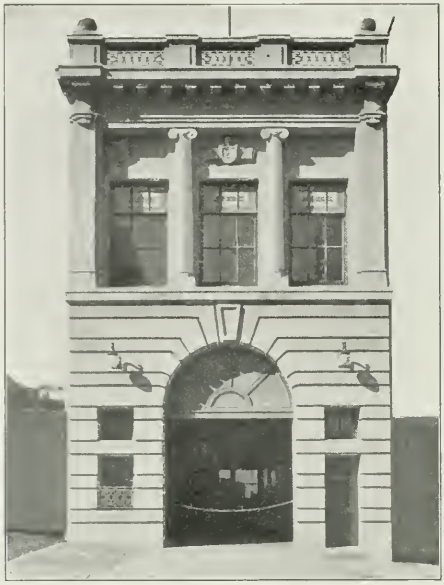
Home of Engine No. 1, San Francisco Fire Department

Home of Engine No. 10 San Francisco Fire Department

The general hospital, which will be four stories high, will have room for 512 patients. It will be constructed so that if later it is found necessary, 752 beds can be provided. To the east and in the rear of the office will be an imposing courtyard leading to the administration building, at the sides of which will be several wards. These wards will run east and west, and be connected with the administration building by a wide corridor which will extend the entire length of the site and unite all of the structures.

Home of Chemical Engine No. 11, San Francisco Fire Department

Home of Engine No. 31, San Francisco Fire Department



Home of Engine No. 2, San Francisco Fire Department

The receiving building, which will be used as an emergency and surgical pavilion, will be located on the north end of the site. Between it and the administration building will be two surgical ward buildings, each four stories high, while to the rear, but centrally located and connected with the main corridor, will be the main service building. Two medical ward pavilions, also four stories high, will be erected to the east of the administration and service buildings, and to the south of them will be the home for the nurses. In the center of the grounds and at the rear of the service building will be a power house and laundry; to the north and close to the emergency pavilion will be the sheds and stables. The morgue will be placed at the extreme south of the site and so arranged that a view of its entrance will be impossible from the other buildings.

The receiving building has been designed with a four-fold purpose; to receive patients entering the hospital proper; for use as an emergency hospital; for the treatment of minor cases, and as an entrance for students from the medical schools. On the first floor, the wards will accommodate 32 detention cases, and the second floor, which will be devoted to surgical operations and surgical cases, will have two amphitheaters, each furnished for 75 persons. An amphitheater sufficiently large to accommodate 200 persons will be located on the third floor and is to be used for clinical purposes. In the basement there will be a hydrotherapeutic department and a ward for the treatment of orthopedia.

The main ward buildings will be divided into 30 bed units, with 26 in a ward 110 x 26 feet, and 2 separation wards of 2 beds each, with a cubic air space of 1500 feet for each patient. In the middle of the large wards on the north side will be placed a sanitary tower, containing toilet accommodations disconnected from the ward by a cross-ventilated lobby. In the administration portion of the wards will be a dressing-room where minor operations may be performed without moving the patient to the surgical pavilion. A diet kitchen with dining-room attached, a laboratory, linen room, toilets and a large solarium will be provided for each ward. An elevator capable of carrying a bed and four attendants will be constructed in each ward building. A large porch on the south side of the first floor of all wards will permit of patients being wheeled into the air and sunlight. The roof of the main connecting corridor also will be available for that purpose.

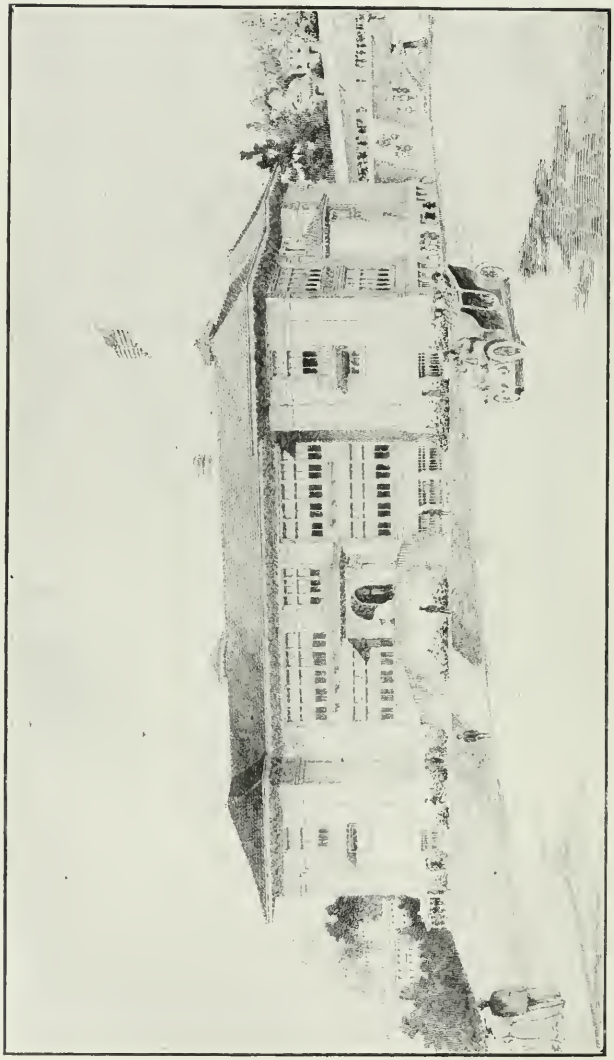
The administration building will be three stories high. Offices for the superintendent, Health Board, medical corps and matron and a reception room will occupy the first floor. The two upper stories will be devoted to the use of the medical staff and internes and also will contain a library and recreation rooms.

In the rear of the administration building will be the main service building. Located at the center of the main corridor, it will be easy of access from the other structures. It will contain a large kitchen; a serving pantry from which all food will be served for removal in food wagons to the wards; secondary serving pantries between the medical staff dining room and nurses' dining room and the male and female help dining rooms. The drug and linen storerooms also will be located in the building. The two upper floors will be furnished as quarters for the help. In the basement will be a general store room, bake house and apartment for the clothing of patients.

The nurses' home will be situated at the extreme southern end of the main corridor and will have a garden facing the south where the attendants will be able to enjoy themselves and be free from view of the ward windows. A large lecture room, social hall, recreation rooms and a suite for the home matron will be situated on the first floor. The two upper stories will be arranged for the 120 nurses who will be employed in the hospital.

The laundry and power house will be in the center of the group formed by the general infectious diseases and tubercular hospitals so as to give equal distribution and minimum length to the steam mains, etc. All clothing sent to the laundry will be passed through a steam disinfector before being turned over to the laundry hands. In addition to the large boilers for heating and hot water services, there will be a generating plant which will provide light and also power to operate the elevators; a refrigerating plant to supply the ice needed for the several hospitals; a vacuum cleaning apparatus and an incinerator to destroy the garbage, old bedding and clothes. Tunnels will connect this building with the three main institutions and in the tunnels will be laid the steam, hot and cold water mains and other conduits. When bodies are being removed from any of the wards to the morgue they will be carried through these tunnels, thus sparing the patients, as well as visitors, all depressing sights.

In the ambulance sheds and stables will be housed two vans for general use and one for the removal of patients having infectious diseases. Care will be exercised in keeping these ambulances as much apart as possible.



One of the New Grammar School Buildings, San Francisco

Home of Engine No. 40, San Francisco Fire Department

The morgue will be provided with two autopsy rooms and a demonstration room which will accommodate between 75 and 100 students.

The infectious diseases hospital will consist of two-story ward buildings. Each floor will be divided into two units, each unit to be composed of a nine, three and two bed ward constructed to provide 2000 cubic feet of air space for each patient. By this subdivision eight units of fourteen beds each are secured. An open porch on the south side of the building will give sunlight and air to the wards. The administration building connected with this hospital will afford quarters for the medical officers, three internes and twenty-five nurses. The kitchen, dining rooms and apartments for the help will be located in a service building, two stories high. Entrance to the hospital will be from Vermont street and at the gateway will be an office with rooms for the gatekeeper.

In the buildings for the tubercular patients every modern improvement known to medical science will be installed. The patients will be divided into two classes—incipient and advanced. The incipient patients will be treated in a one-story arcade, open on the south but protected from the wind, while the advanced patients will be housed in two-story wards provided with shutters that can be thrown open at the discretion of the medical attendants. A porch will afford the patients on the ground floor an opportunity to exercise in the air and sunlight, while those in the upper wards will use the roof of the main corridor.

A Monument in a Public Place. Dedicated to the Heroes of the War with Spain
Edward L. Frick, Del.

ARCHITECTURAL LEAGUE
OF THE
PACIFIC COAST (Official)

S. B. A. A. Competition Work for September

AS THE regular programs issued by the S. B. A. A. are not issued in the summer months, and as the students in San Francisco wished to keep on with their work during the month of September, a special program was issued by the educational committee of the Architectural League of the Pacific Coast. Some 21 students handed in drawings. Of these the following received mentions:

Subject: "A Monument in a Public Place, dedicated to the Heroes of the War with Spain." Judgment of October 3, 1910:

Edward Frick, placed first.
J. S. Gould, placed second.
Ed. Flanders
T. Bearwald
Wm. Garren
Fred Jones
H. Schroder
Wm. J. Helm, Jr.
A. J. Horstmann
A. Urisin
J. A. Magee
W. W. Morrison
G. Thibault
J. W. Bagley, H. C.
A. R. Williams, H. C.
Thos. Bendell, H. C.
C. Warnecke, H. C.

NOTE: These mentions are not credited by the Society of Beaux Arts Architects as the program was not issued by them.

* * *

More About Concrete Blackboards

SINCE the publication in this magazine of a brief article on concrete blackboards, many letters have been received requesting more detailed information. Several of the leading scientific and engineering journals in the East were appealed to but none of them was able to supply any additional facts. The following, taken from The Construction Record, gives a few facts that were not embodied in the article already alluded to:

"One of the recent developments in the use of concrete is the concrete blackboard. For years chemists, plasterers and blackboard men have been working on the problem of how a black plastic board could be troweled to a smooth surface without producing a gloss, but without success. A liquid concrete finish has been perfected that when applied to the walls makes a blackboard that is said to be better than slate, writes a contributor of an exchange.

"The foundation is concrete applied to an ordinary brick or wire lath wall, and is waterproof. The finish is a cement, and assimilates with the foundation. As the board can be applied either to brick or metal lath, it saves the rough cost of plaster specified where slate is to be installed. The surface of this board is smooth, consumes very little chalk, and eliminates to a great degree the dust which is the worst problem to be contended with in the school room. A dead finish is produced, giving no reflection, making it possible to see this board from any angle of the room. As it is made on the wall, there are no joints or seams which are unsanitary, no unprotected edges to chip off, and it is noiseless.

"The walls for plastic boards have been too soft to stand the wear and tear of hard work; holes were easily punched in the plaster, which soon grew larger, and it was impossible to patch them and make a smooth joint It is claimed that this will not happen with the cement board, as it is too hard to break under anything short of a blow with a hammer."

The Use of Stained Glass for Shades and Reflectors

THE enjoyment of color is one of the most universal of esthetic instincts. While its infinitely varied phases manifested in nature and the painter's art appeal to the highest development of this sense, there is an enjoyment in the contemplation of simple patches of color for their own sake. This is not unlike the pleasing effect of certain individual sounds. This enjoyment of color for its own sake reaches its highest state when the colors are seen by transmitted light. The most exquisite color effects in nature are utterly beyond the ability of the painter to represent on canvas, for the simple reason that they possess to a greater or less extent the quality of transparency. The blue of the sky, the green of the sea, and the gorgeous coloring of the sunset and the autumn forest absolutely defy reproduction on an opaque surface.

The art of glass painting and setting has always held a high place in pictorial art. Although it is limited by numerous mechanical and technical difficulties, this field of art nevertheless offers opportunities for effects both impressive and beautiful. Even if nothing more definite is attempted than to furnish a feast for the color sense, the results are worth obtaining.

Figure 2

Figure 1

The peculiar beauty of stained glass was confined to uses where it could be illuminated by natural light until very recent times, when modern light-sources, with their brilliancy and volume of rays, made it possible with artificial illumination.

Colored and painted glass is available for use in the construction of globes and shades for artificial light, either where a brilliant illu-

mination is not desirable, or where special lighting is required for only a small space underneath

Figure 3

the lamp. These conditions generally maintain in dining rooms and "dens." It is, of course, impossible to give an adequate idea of stained glass without the use of color. The illustrations, however, will give some idea of the effects produced by the combination of artistic metal work with modern stained glass.

Fig. 1 shows a dome fixture, in which the metal work is designed along the lines of hand-wrought designs. The panes of glass have a rough, irregular surface on the outside, and are hand-painted on the inside, the painting, of course, being fired by the usual process. A result of the translucency of the glass in connection with the rough exterior surface produces a particularly soft and pleasing effect of color.

Fig. 2 is a crown fixture of simple but artistic design, supporting four small reflectors having Art Nouveau tendencies in their decoration. In this fixture efficiency is not the first object sought, although the shades serve the purpose of reflectors to a certain extent.

Fig. 3 is a fixture of unusual design. It would be quite suitable for a "den," where the rich coloring of the central bowl with its setting of colored gems would give the touch of gorgeousness generally desired in such cases.

Fig. 4 is a table lamp having a well-designed shade of richly painted glass of the same order. In this case the leading effect commonly used is secured by painting on the sections of glass. This method affords a much less expensive way of securing the colored effects of leaded glass, and thus to a large extent removing the chief obstacle in the way of more popular

Figure 4

use of stained glass in connection with artificial lighting.—Illuminating Engineer.

Among the Architects

American Institute of Architects

(ORGANIZED 1857)

Next Convention in San Francisco, in January, 1911.

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San Francisco Library

A bond election will likely be called in the near future by the board of supervisors of San Francisco for the purpose of floating an issue of $600,000 for a public library building. It will be erected in the block bounded by Hayes, Franklin and Fell streets, and Van Ness avenue. The building will be three stories high, surmounted by a dome. In architecture it will be a composite of the classical Grecian and Roman styles. The stack rooms will have a capacity of 340,000 volumes. The city treasury already has about $125,000 for the purpose, which added to the amount raised by the bonds, would give the city a beautiful and imposing edifice. Reid Bros. have prepared preliminary sketches of the building.

Architect Rixford Makes Denial

The following letter has been received from Architect Loring P. Rixford, who was a member of the San Francisco Board of Supervisors during the incumbency of the late Newton J. Tharp:

San Francisco, Sept. 28, 1910.

Mr. Frederick W. Jones,
Managing Editor,
Architect and Engineer.

Dear sir: I notice on page 97 of your journal you have quoted Mr. Newsom, Commissioner of the Board of Public Works, as saying that I was Mr. Tharp's brother-in-law. For your information I am sending you a letter which I sent to Mr. Newsom after he had made that statement:

Mr. William A. Newsom,
Commissioner Board of Public Works.

Dear sir: I notice in this morning's 'Call' that you are quoted as saying that I am the brother-in-law of former City Architect Newton J. Tharp.

Are you misinformed on the subject, or are you saying this with the intention of leading the public to believe that the last administration was guilty of nepotism?

My acquaintance with Mr. Tharp was purely a professional one, and I probably would not have met him if we had not been of the same profession.

He was recommended by me to the Board of Public Works on account of his professional ability and integrity and that alone, and I do not hesitate to say that that ability and integrity have manifested themselves in his work for the city of San Francisco.

Very truly yours,
Loring P. Rixford.

I desire to emphatically deny that Mr. Tharp was my brother-in-law, and I desire that any such false statement be corrected.

I should like to add also that my letter to Mr. Newsom still remains unanswered.

Very sincerely yours,
Loring P. Rixford.

South Pasadena Bridge

County Surveyor I. B. Noble, 121 North Spring street, Los Angeles, has completed plans and specifications for a bridge to be erected across the Arroyo Seco on Pasadena avenue. The total length will be about 2000 feet, mostly comprised of dirt fill. The bed of the arroyo will be spanned by two sixty-foot reinforced concrete arches. The extreme dimensions of the concrete portion are—length, 164 feet; height, 48 feet, and width, 76 feet. The arches will be 21 inches thick at the top and at the base, the three piers will be 15 feet in thickness.

Architects Enter Competition

The German House Association of San Francisco held a competition for a building to cost $200,000, the following architects being invited to compete: Frederick H. Meyer, Henry Meyers, Gielfuss & Son, Philip Schwerdt, A. R. Denke and J. W. Dolliver. Architect August G. Headman was elected to act as architectural adviser.

Prospective Country Work

Santa Monica is looking for a site for a new high school building.

Alturas is about to erect a $20,000 school house.

Placerville supervisors have authorized the construction of a new court house.

Sacramento will have a $500,000 court house from plans by Architect Herold.

San Jose lodge of Elks will spend $80,000 for a new building.

San Jose will have a $50,000 building for the Hester school district.

Niles will have a new school house; also a bank building.

Vallejo has voted bonds for a handsome high school building.

San Rafael Elks are to have a building.

Alameda will have a postoffice building to cost $100,000. So will **Santa Cruz.**

San Leandro wants a new town hall.

Monrovia votes a $125,000 high school.

Long Beach wants bids for new Polytechnic school building.

Napa County is considering plans for County Infirmary.

San Lorenzo will build a new school house.

Visalia Hotel Building

Architect Homer W. Glidden, 805 Wright & Callender building, Los Angeles, has drawn plans for an artistic hotel building and summer resort to be erected at Woodlake, Cal., for Gilbert W. Stevenson of Hollywood. The site of the structure will be an ideal one, located 17 miles east of Visalia, at the end of the newly completed electric railway line. The surrounding acreage will be laid out into a beautiful landscape.

The building will be two stories high and will cover an area of 78x135 feet A separate wing will contain the dining room and kitchens. The first floor will be plastered over metal lath, and will be ornamented with wide verandas and stucco finish. The second story will be finished with cedar shakes, and the roof will be of asbestos.

In connection with the hotel, 20 or 30 private bungalows will be erected, all in keeping with the main building. Excavation for the hotel is now under way, and bids are being taken by the architect. Work on the superstructure will begin early in the spring. The hotel will cost about $40,000, and the bungalows as much more.

New Chapter Members

At a special meeting of San Francisco Chapter, A. I. A. held in August, the following architects were admitted to membership: William H. Weeks, Edgar A. Matthews, Henry Harrison Hedger, Willis Lowe and J. Harry Blohme.

San Francisco Architectural Club.

The directors of the San Francisco Architectural Club held "open house" on the afternoons and evenings of Thursday, Friday and Saturday, October 6, 7 and 8. A large number inspected the new club rooms and admired the attractive furnishings.

The class in design is criticised by Mr. Arthur Brown, Jr., and Mr. George W. Kelham. This class contains about 40 members.

The class in structural engineering boasts about 50 members who are progressing rapidly under the instruction of Mr. Charles Derlith, Jr., Dean of the College of Civil Engineering of the University of California.

The class in architectural history has begun its meetings with illustrated lectures by Mr. August G. Headman, a graduate of the architectural course of the University of Pennsylvania.

Other classes, such as life class, free hand drawing, and architectural rendering are in preparation.

Personal

Architect John Galen Howard, who was in charge of the Oakland city hall competition, has been enjoying a trip abroad.

Architects Carter and Foley, with offices in the Call building, San Francisco, have dissolved partnership.

Architect Edwin Bergstrom of Parkinson & Bergstrom, suffered a relapse after his recent operation for appendicitis and his physicians state it will be several months before he will be able to resume active professional duties.

George T. Colmesnil has been appointed acting city architect in San Francisco to temporarily fill the vacancy caused by the death of City Architect Fisher.

San Francisco Schools

Within a short time work will be started on three new high schools for San Francisco, the total cost of which will be $1,300,000. They will be built along the latest lines for educational facilities and conveniences. Ground will first be broken for the new Lowell High School, to be erected on Hayes street, extending the length of the block between Masonic avenue and Ashbury street. The new Lowell High School will be built of brick and terra cotta, with a steel frame and a commodious basement. There will be forty rooms. The pride of the Board of Education is to be the new Polytechnic High School, to be erected between Frederick and Carl streets and First and Second avenues. With a bond issue for the purpose of $600,000, the school department will have erected a three-story brick and terra cotta building on a steel framework, to include sixty rooms.

Oakland's New City Hall

Plans for Oakland's new city hall are about two-thirds finished, according to advices received from the architects, Messrs. Henry Hornbostel and Sullivan W. Jones. The contracts are to be divided under several heads. In the matter of stone, the contractors will be asked to bid on the furnishing of marble, granite, stone from Manti, Utah, and other limestone materials. Within forty days the architects expect to have the detail plans and specifications for the new structure in readiness for bids.

A suggestion of the architects which has met with the approval of the members of the Board of Public Works is that the tower of the new city hall be fitted out with appliances for its illumination on gala or festival nights. They propose to equip the entire exterior with permanent sockets in which can be screwed electric light globes, which when illuminated, will make the tower a blaze of light that can be seen for miles. Four searchlights will be located on the corners of the smaller ornamental building which is to serve as the base of the new structure. These will be so situated as to allow for the throwing of the strong light on the tower and the huge clock.

The Coming Institute Convention

Architects are looking forward with much pleasurable anticipation to the coming convention of the American Institute of Architects which is to be held in San Francisco early in January. The president of the Institute is already making up the program which will be replete with interesting features. Papers on many subjects of interest to the profession are to be read by some of the most prominent architects in the country. Competitions will be among the subjects that will come up for discussion. The San Francisco chapter will soon appoint various committees to take charge of the entertainment of the guests and it is planned to give the visitors the best time of their lives. Hotel reservations already have been made in a number of instances.

Second Death in City Architect's Office

For the second time in three years the office of City Architect in San Francisco has been made vacant by the death of the incumbent. With the memory of the death of the lamented Newton Tharp still fresh in the minds of the people comes the shocking fatality to J. L. Fisher who had been acting City Architect since the resignation of Architect Mohr. Fisher was instantly killed when an automobile, in which he was riding, turned turtle. His body was pinned beneath the heavy machine and he was smothered to death.

The Los Angeles Architectural Club

At the September social meeting of the Los Angeles Architectural Club the names of thirty new members were announced, bringing the total membership up to 140.

The new classes started by the club this year already have become popular, a tribute to their actual value to the members from an educational standpoint. The sketch class, under the tutorship of Mr. John T. Vawter, has held two or three sessions. It now has about twenty members. The life class has been organized, with Mr. Florian Peixotto as patron, twenty-six enrolling themselves as members. These classes are free to all members of the club.

The club's finances are in good shape, although many members are in arrears in payment of dues. This is really a deplorable state of affairs in view of the fact that the various committees have much work mapped out in the way of bettering the club's quarters and are sadly handicapped by a lack of funds above actual running expenses for the maintenance of the club rooms. Much progress could be made with more funds available, in fitting up the quarters in a manner that the club's dignity properly demands, and in furthering the plans for enlarging the rooms.

The club will be called upon very shortly to begin active work in preparation for the forthcoming exhibition and the entertainment of the Architectural League of the Pacific Coast, and this will require all the funds that the treasury can command.

San Diego Architects Organize

The architects of San Diego have effected a permanent organization, and plans are under way to affiliate with the American Institute of Architects as a chapter of that national organization. Meetings are held in the offices of Mr. Irving J. Gill.

The following officers have been elected: W. S. Hebbard, president; S. G. Kennedy, vice-president; Irving J. Gill, secretary; Charles Quayle, treasurer. Among the members are W. S. Hebbard, G. S. Kennedy, Charles Quayle, Edward Quayle, Henry Lord Gay, Robert Halley, Jr., Del W. Harris, G. A. Hanssen, John B. Stannard, Emmor B. Weaver and R. S. Requa.

Oakland Apartment House

A. J. Mazurette is preparing plans for a three-story and basement apartment house, to be erected on the corner of Fifteenth and Madison streets, Oakland. The structure is to be of frame with a veneered brick front, marble entrance, etc., and will be fitted up with every convenience. Roger Coit is the owner.

Oakland Polytechnic School

Work has been commenced on the new Polytechnic College of Engineering, at Thirteenth and Madison streets, Oakland. The plans for the structure were prepared by A. W. Smith, 1004 Broadway, Oakland, and call for a four-story and basement building of reinforced concrete, covering an area of 120 x 60 feet. Modified Mission is the style of architecture employed.

The ground floor of the college will be occupied by machine shops, mechanical, electrical and hydraulic laboratories, while the three upper stories will be turned over to college offices, physical, chemical and assaying laboratories, lecture and classrooms, drafting and blue print rooms, stationery store, library, instrument rooms, etc. The new institution will be run in conjunction with the Polytechnic Business College, under the direct management of Professor Charles D. Gibson.

Annual Meeting of Los Angeles Chapter

The annual meeting of Los Angeles Chapter, American Institute of Architects, was held October 11th, at which the following officers were elected: President, Frank D. Hudson; Vice-President, R. B. Young; Treasurer, August Wackerbarth; Secretary, Fernand Parmentier. The three vacancies on the Board of Directors were filled by the re-election of Octavius Morgan and the election of Frank L. Stiff and John C. Austin.

Successful Competition

Three Los Angeles architectural firms participated in a competition conducted under the rules of the American Institute, for a design for the First Congregational church of Riverside. Messrs. Arthur B. Benton, Lester S. Moore and Myron Hunt and Elmer Grey were the competitors and the award was made to Messrs. Hunt and Grey, Theo. A. Eisen acting as advisory architect with the church building committee. The successful design calls for a building in the Spanish Renaissance style of architecture.

Noted Concrete Expert

Richard L. Humphrey, a prominent Philadelphia engineer, writer and concrete expert, recently visited San Francisco and inspected a number of the city's concrete buildings with a view to making a report to the Cement Dealers' Association at their coming convention

Fireproof Warehouse

Architect W. J. Miller of San Francisco has prepared plans for a modern fireproof warehouse to cost in the neighborhood of $85,000, and to be erected on Mission street, in San Francisco, by the Wilson Bros.' Van and Storage Company. The building will be of reinforced concrete and five stories high

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THE CHAPTER'S PART IN PLANNING THE 1915 EXPOSITION

Senator Newlands' remarks before the members of San Francisco Chapter, American Institute of Architects, which were printed in full in the September Architect and Engineer, have caused much favorable comment, not only from members of the architectural and engineering professions, but from the public at large. The idea of making the buildings permanent is a splendid one, and would probably mean the adoption of better architecture and the use of more substantial materials than would be practical with temporary structures. The first cost would probably be a little more but this need not be felt by the Exposition Company provided the proposition receives the combined support of the railroads, as outlined in the Newlands' scheme. We hope the Chapter will work in harmony in this matter for it means much to that organization to have the say in working out and planning the artistic as well as the structural details of a World's fair. The development of Senator Newlands' suggestions, must, of course, be left to thoroughly competent hands, and we know of no abler body of men to intrust with this responsible work than the members of the Institute Chapter.

BEAUTY IN UTILITY UTILITY IN BEAUTY

Arnold W. Brunner, president of the New York Chapter of the American Institute of Architects, recently addressed the architects and builders of Cleveland on city development. The key-note in all city planning he summed up in six words: "Beauty in Utility—Utility in Beauty." The question of replanning cities is a comparatively new one with Americans, he said, the great prosperity of recent years and the influx of population to the cities creating the necessity of study on this subject.

Like Topsy, our cities have just grown, and like Topsy they are not very beautiful. We are now engaged in re-making cities that should have been planned with greater regard for the present and the future. It should be realized that an architect is merely a scene painter and that this scenery is entwined with the history of countries. When we think of Egypt we at once have an image of the pyramids and when we think of Rome the Coliseum comes to mind. It should be remembered that architecture is important to the city as an asset. City architecture should, however, be based on common sense. Mr. Brunner abhors the term "The City Beautiful," preferring the term "The City Practical." It should be beauty in utility and utility in beauty. A crowd undrilled becomes a mob. The same crowd drilled and led becomes an army. Our cities need organizing. They need a definite plan. There is no reason why the growth of a city should not be controlled. To have a city planned need not mean upsetting things all at once. In Paris, boulevards are now being finished that were planned half a century ago.

Washington has the best city plan, which is the original plan of Major L'Enfant re-adopted by that city in recent years. New York is perhaps the worst-planned of all our American cities, its designers having made every conceivable error possible to make. It seems that every conclusion was wrong and little regard was had for the future possibilities and needs of the great metropolis. We are now paying millions for parks when we could have bought them in years gone by for hundreds. Many other cities are almost as bad. It seems to be the American way to make things over three or four times and thus pay up for neglect. Mr. Brunner is of the opinion that civic art pays from all points of view as an asset to a city, and in this contention he is undoubtedly correct.

BLACK WALNUT QUEEN OF CABINET WOODS

Twenty or thirty years ago the immense forests of Ohio and Indiana contained vast quantities of black walnut trees. In those days walnut was practically the only wood used for furniture as it is even now the sole wood used for gun stocks. Black walnut then was quite inexpensive and any native of the middle West who was brought up on a farm can recall the time when his father used black walnut for firewood, posts and fence rails. Times have changed, however, and walnut lumber which once could be purchased here in the West for $75 per thousand is now worth $200 per thousand. Walnut at the present time is as valuable as mahogany and for interior finish and furniture it is in the same class with its tropical competitor. It is fully its equal in beauty and richness of coloring, and by far its superior in soft evenness of grain and general reliability.

The old California mansions, few of which escaped the devasting catastrophe of 1906, but many fine examples of which still remain in Alameda county, were generally finished in black walnut, and the fixtures, where any care whatever has been taken of them, are still as rich and elegant as when they were installed. What are more lovely than the massive walnut stair-cases of a generation ago, with their wonderful built-up newel-posts, paneled with burl walnut on each of their many faces, and their delicate turned balusters and ample rails?

It is a trite saying, but nevertheless true, that history repeats itself. Black walnut is coming into its own again. More and more is its use specified in very high-class work, as it is recognized to be without a peer among hardwoods, and represents the quintessence of refined taste. A number of beautiful residences have lately been finished wholly or partly in black walnut. Old walnut furniture is being taken down from attics and other places where it has reposed for a quarter of a century and

is being dusted off and re-upholstered. Black walnut is today in the luxury class. Its price is as high as any hardwood except teak, and this may account, in a measure, for the great esteem in which it is held. The collection of old walnut is now as great a fad as the collecting of old mahogany.

THE TRUTH ABOUT CONCRETE

Elsewhere in this number of The Architect and Engineer, is published extracts from an article by one Brooks on "The Truth About Concrete." At first sight the article appears to be a skillful attack upon concrete construction by an architect or contractor favoring other methods of building. Upon close examination, however, the writer is found to entertain some very favorable opinions of concrete, provided proper precautions are taken in the selection of aggregates, the mix and the reinforcement. While Mr. Brooks goes on to enumerate failures, he does not hesitate to attribute these weaknesses to causes that could have been remedied. Unbiased engineers will agree with him that concrete construction is still in the experimental stage and that the constructions of the last decade have been done rather on a large scale without waiting in many instances for the outcome of proper tests or studying the conditions to which the concrete structures had to be subjected. Since we know that concrete is destroyed even by feeble acids and by alkaline solutions, why do engineers expose sewers, aqueducts and pipe lines to these corroding agents? By the expenditure of a comparatively small amount of money, the conditions of the soil could be properly examined, which would tell whether the water percolating through it carries alkalies in sufficient quantities to affect the concrete pipes; or the composition of the refuse water should be determined accurately before deciding upon concrete sewers. Water to be carried through aqueducts should be tested repeatedly in order to find out if it carries carbonic acid in solution, which is sure to soften the concrete if present in noticeable amounts. Instead of doing this, millions of dollars are spent on such work with the result that the structures decay in the course of a few years and the construction in question becomes a disgrace to the cement industry. Is concrete to blame if it is thus used in the wrong place?

The author calls attention to the fire-resisting qualities of concrete which, in his opinion, are exaggerated by most engineers. There is certainly some truth to this statement. Most builders call fireproof every construction that cannot be ignited like wood and forget that concrete columns, beams, or floors with the usual one-inch fire-protection covering the reinforcing metal are mostly affected by fire to such an extent that they have to be replaced or that they collapse. Viewed from this standpoint, our modern so-called fire-proof constructions are fire-resisting only to the extent of not supplying food to the flames; however, they are, as a rule, sufficiently damaged by fire because they cannot withstand sudden heating and in this direction architects should make an effort to improve our modern constructions.

In reply to the Brooks article and touching upon the matter of fire-resistant materials, "Cement and Engineering News" has the following:

> In cases in which a fire advances slowly from one part of a building to another, as in calm weather in buildings which do not contain much combustible material, ordinary fire-protection by means of terra-cotta tile around structural steel or an inch or two of concrete outside of the reinforcement may be sufficient. But, where there is plenty of food for the flames or where the fire is fanned by high winds or has been confined to one part of the building and rushes suddenly to another part of the structure through the falling in of a wall or breaking in of windows, all members of a structure are exposed to sudden intense heat. Sharp-pointed flames, resembling the flame of a blow-pipe, shoot against columns, beams and girders, and crack the terra-cotta tile or concrete sur-

rounding them, melting the structural steel or reinforcement. In our opinion, architects should provide for such conditions, as they are not rare. What we need, in order to make absolutely fireproof at least the now so-called fireproof buildings, is a material which will endure sudden heating and gradually convey the heat to the material underneath. Such material would be asbestos made into tiles that could be dove-tailed into concrete. Nails or wire or metal of any description should be avoided in fastening such tiles to the underlying material, as metal conducts the heat quickly to the interior of the member thus causing uneven stresses. Pure asbestos being too soft would not be suitable. On the other hand, transit board cannot withstand high temperatures. Possibly the asbestos board made under the Hatschek patent would answer the purpose. This has been used as asbestos shingle; yet, to our knowledge, it has not been utilized so far as fire-proofing in the way suggested.

Thus there is room for improvement in all branches of architecture, but especially in concrete construction, and a lecture like that by Mr. Brooks, therefore, should be received with enthusiasm rather than indignation.

The Decreasing Efficiency of Labor

(From the Contract Record)

A CHICAGO contemporary contends that the costs of work at the present time are from 25 to 50 per cent higher than they were five years ago. On the face of it this is startling, and possibly an exaggeration, but certain it is that the cost of construction work has increased materially in the period named—in Canada equally as much as in the United States,—and it is disturbing, under these conditions, to reflect upon the decline in the efficiency of labor. Both skilled and unskilled labor are included. This decrease in efficiency, taken in conjunction with the increased wages and higher prices of recent years, show up very unfavorably against the conditions under which construction was carried out but a few years back.

Various causes are adduced for the less efficient workmen. The reason assigned by some is that work is much more plentiful than formerly; by others that those in charge are less efficient, and by a few that it is traceable to the labor unions. Those who have studied the question at all seriously remain unconvinced after hearing arguments based upon the above contentions. The cause has not yet been wholly determined, neither has a satisfactory solution been offered. The matter is a vital one to all interested in construction, but most of all to contractors.

The contractor must brace himself to meet the extra burden by more scientific management and by making himself familiar with the latest labor saving machinery and tools, which, of course, are designed to take the place of men. The former must be the primary consideration, however, for efficient men will always be needed in construction work. The progressive contractor, he who is able to read the signs of the times and who can adapt himself to the changed conditions of the present day will meet the situation by improved methods of management. The regular daily or weekly wage does not bring out the best that is in a man and the contractor who feels this and who offers an incentive greater than the regular daily wage will doubtless obtain good results from his men. There is a growing tendency on the part of the laborer of today to consider that he is worthy of something more than his hire; that he should be afforded the chance to earn extra remuneration by ability and hard work. This tendency in itself is not alarming. The way to meet it is to modify the time honored wage system and introduce a system of payment whereby a man will be rewarded more nearly in proportion to his merits.

Woman Sculptor Would Mould Statue for San Francisco

Kuhne Beveridge, the sculptor, in a letter from Munich, has asked the San Francisco park board for a commission to make a statue to represent the rehabilitation of San Francisco. She says that she has prepared a sketch and the subject is described in the letter as follows:

"By supreme effort a man is upholding himself from the flames and smoke below. With one hand he holds the hand of a dead woman. She is dragging him down to the seething mass of human debris and tortured beings below, but with one last sublime effort he keeps himself up in order to support another woman, a young woman, the new San Francisco. She stands on the man's strained arm. She is full of hope and ambition and courage. She is led by the sun and one feels her fate will be a glorious one. Pride and energy and defiance are shown in her expression. She is the personification of her race, the true Californian."

HEATING AND LIGHTING

Plumbing and Electrical Work

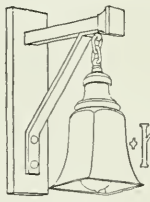
Lighting a Big Hotel

IF any justification were needed for considering the lighting of the new Blackstone hotel in Chicago, a notable installation, it might be found in the fact that the architects, Messrs. Marshall and Fox, have received a gold medal from the Architects' Society for having produced the most perfect hotel in its convenience for guests, artistic design and modern equipment in the world. The World's Fair of 1893 showed what Chicago could do in the way of magnificence and artistic effect in architecture; and when the city suddenly awoke to the necessity of increasing its hotel accommodations it was to be expected that no half-way measures would be taken.

The Blackstone hotel, though but one of several of the new buildings for this purpose, shows that Chicago is equal to her record. In order that the hotel should represent the very latest achievements in comfort and convenience for its guests, Mr. Drake, the president of the Blackstone Hotel Company, visited all of the large hotels of the east to study not only their good qualities, but their deficiencies, if such existed, as well. He found that there was at least one common deficiency, viz., the artificial lighting, and resolved that the guests of the Blackstone should have no just cause for complaint on this score. He took the matter up with his architects, in connection with illuminating engineers, and endeavored in this, as in all the other facilities, to reach as near perfection as the present state of the science and art of illumination would permit.

In a general way the installation may be divided into two parts; that in which direct lighting is used, and that in which indirect illumination is installed. The choice between these two methods was determined primarily by utility, and, secondarily, by artistic considerations. As much of the interior architecture is of the Louis XVI period, the fixtures naturally were adapted from this school of design; but where variations in the architecture permitted, or where utility was of prime importance, indirect lighting has been used. It may be stated in this connection that this is the first hotel to adopt this method of illumination on an extensive scale.

In the exquisite Grecian marble cafe the fixtures consist of shallow bowls suspended by bronze chains. Each bowl contains twenty indirect lighting units, consisting of 60-watt tungsten lamps, with clear bulbs and reflectors. The room is 47 x 50 feet, with a 16-foot ceiling. The bowls are hung four feet from the ceiling, there being six of them in the room. It is generally conceded by architects that pure classical architecture furnishes one of the most difficult of all problems to handle with respect



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to artificial lighting. The methods used in ancient Greece were so absolutely inadequate and unadaptable to modern conditions as to render them out of the question as models. The only alternative is, therefore, an adaptation of twentieth century lighting units to an architecture twenty centuries old. The indirect method of illumination possesses the unquestioned advantage of removing the actual sources from view, so that there is no possibility of a direct suggestion of incongruity, while the general diffusion of the light after the manner of daylight brings out the architectural features in their proper perspective and relation.

Another strictly classical and equally magnificent room is that utilized as a barber shop. This is claimed, and apparently with perfect justice, to be the most beautifully furnished and equipped barber shop in the world. The ceiling has a large cove decorated with a latticed design. The central portion is finished in a delicate blue tint, while on the latticed portion pale blue and white are used. The lighting fixtures follow strictly the classical lines. Each contains five indirect lighting units, consisting of 100-watt, clear tungsten lamps, with reflectors. The lighting fixtures follow strictly the field of vision is certainly a most desirable thing in the case of a barber shop, for there is nothing more annoying to a patron than to be obliged to stare into a dazzling lamp or reflector hung above his face, or in such position that there is absolutely no escape from its glare.

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The indirect lighting of the grillroom is of a decidedly novel and interesting character. The ceiling is broken up into a large number of shallow polygonal panels, at the chief intersecting points of which are suspended single tungsten lamps and special indirect lighting units. From the engineering viewpoint this room is remarkable as showing the possibility of using the indirect lighting system with a highly decorated ceiling and units placed in very close proximity to it. Side brackets, with imitation candles, are used for purely decorative effect.

There used to be a saying among traveling men that "if you want to enjoy your meals at a hotel keep out of the kitchen." But the Blackstone kitchen certainly gives the lie to this proverb. It is impossible to conceive of anything more scrupulously clean and inviting than this modern culinary laboratory. The indirect lighting fixtures used here are of a commercial type, each consisting of two units supplied with 100-watt tungsten lamps. The tops of the reflectors are eighteen inches from the ceiling, which is of white tile. The chef, Carl Decker, perhaps describes the result as briefly and completely as it could be put: "We have daylight here twenty-four hours a day."

Old Cement Sewer Well Constructed

Workmen from the City Engineer's office, Reno, Nev., recently dug up an old cement sewer pipe which was laid twenty-six years ago. The pipe was as hard as iron and rang like a piece of metal when struck with a rock. It took the hardest sort of blows to break it. City Engineer Mann declares that this proves conclusively the usefulness of cement for underground work, and that it is one of the most perfect concrete specimens he has ever seen.

Ventilation

By P. Abrahamson, Engineer*

VENTILATION is the process of bringing air through any place or enclosure, for the purpose of expelling impure air and disparting anything noxious, thereby preserving the air in a state of sufficient purity to be healthful for breathing purposes, notwithstanding the tendency to vitiation constantly in operation from the breath of occupants, the burning of illuminants and other causes. While proper and adequate ventilation is an essential and inseparable part of the heating problem, it is more necessary to health than heating. We could possibly manage to exist, even in a comparatively cold climate, without artificial heat, but whether our houses are heated or not, if our rooms were not perfectly ventilated, all occupants would quickly perish.

In the progress of civilization, the time will soon be here, when we will look

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back with amazement upon the period in which the great majority of houses were built without any provision for systematic ventilation. It will some day be considered a crime to construct a human dwelling without any formal scheme for renewing the air in it.

Ventilation is defined by Webster as "the art or process of replacing foul air by that which is pure, in any inclosure, such as a house. There is nothing else so vitally necessary to the preservation of health as pure air. It is recognized and acknowledged by laymen, as well as physicians, that in nearly all diseases, the best curative agent is pure air. There exists no malady in which the intelligent physician does not insist that the patient must be furnished with pure air. There are diseases for which the sole agent applied in many cases, under modern practice, is simply the continuous breathing of pure, fresh air.

This is notably the fact with consumption and allied maladies; and though in a lesser degree, perhaps, but just as surely, pure air is a fundamental necessity in the treatment of all human ailments. Pure air is even more valuable in preventing sickness than it is in curing it.

It is an unquestionable fact that the child growing up to maturity, or any other person, living in a house which is filled with pure air the whole year around will have more vitality, will enjoy more robust health and will be far better able to resist disease than one living in unventilated rooms and breathing an unwholesome atmosphere.

We have pure food laws, and their enforcement is upheld by a strong public sentiment; but it would be vastly more beneficial to the people to enact and enforce pure air laws. For one person who is injured by eating adulterated food, a thousand suffer from breathing impure air.

It is understood that air in rooms to be kept comparatively pure, must be changed constantly, the object being to

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Big Tunnel for San Francisco

Plans are nearly completed for San Francisco's $1,000,000 tunnel through the solid cliffs between Golden Gate park and the ocean that will serve as the drainage outlet for more than one-fourth of the entire area of the city and county of San Francisco. The Sunset district, Parkside, Oceanside, Ingleside and Richmond district, for a score of blocks back from the ocean, are included in a vast drainage section, the largest individual subdivision in the entire city, that will be permanently benefited.

The Sunset area proper extends from First avenue, which is eastward of the Affiliated Colleges, to the great highway that fronts the ocean beach, and then runs through the Sutro forests and into Ingleside, and has a like width along the ocean beach and through the entire east and west and north and south extent of scores of blocks that run from the Golden Gate park frontage to Parkside, and are hemmed in by the ocean and First avenue.

The Richmond drainage area to be served extends from D street or Fulton, to the northerly edge of the land on the ocean and from about Twenty-seventh avenue west. There are about 50 square miles of land surface in the city and county of San Francisco. The drainage region, roughly indicated herein, comprises 15 square miles.

The bore or tunnel will be known as the Mile Rock tunnel. It will begin at C street and will run through the cliffs and about 1,000 feet off Mile rock, and will there discharge the concentrated sewage into the ocean. As described by the board of works the Mile Rock tunnel will be a great example of constructive work. In the first place it will be more than one mile long and it will be driven through solid rock for that entire distance. It will be 16 feet wide and 8 feet high. It will slant downward from the beginning of its course with sufficient grade to give the sewage good headway on its voyage toward the ocean.

Being cut through solid cliffs the tunnel will probably last forever, so that the large initial cost of construction will not be repeated.

The plans for the Mile Rock tunnel will be ready to submit for bids for construction soon. Possibly work will begin on the tunnel during the present fall. The figure of $1,000,000 used herein represents the cost of the tunnel alone, and may be somewhat out of the way, but the estimate of $1,000,000 is approximately correct. When the construction contract is awarded a time limit for the completion of the work will be one of the conditions attending the award.

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By the Way

Some Industrial Information Worth the While

Concrete Appliances Company Claims Damages for Infringement.

Suit in equity to recover damages claimed to the extent of $25,000 has been started in Los Angeles by the Concrete Appliances Company of Los Angeles and St. Louis against C. A. Fellows, contractor for the reinforced concrete buildings for the Santa Fe at Barstow. The company asks an injunction restraining Contractor Fellows from further use of the gravity system of concrete distribution without payment of royalties, and an accounting of profits and damages resulting from the use of the system up to the present time.

This is the first suit brought by the Concrete Appliances Company for infringement of the patents granted last February. Since these patents were granted and the company organized, licenses for the use of the system on the royalty basis have been granted by the company to contracting firms in Los Angeles, San Diego, San Francisco, Stockton, St. Louis, New York and other cities. The royalties demanded for the use of the gravity system are based on a small percentage of the saving accruing from the use of the method, and this royalty also includes charges for designing the appliances required for a particular job, so that the utmost efficiency is secured and the greatest possible saving obtained in the labor and expense of handling the concrete. The system is used by the F. O. Engstrum Company on its various jobs in Southern California, including the Union League building at Second and Hill streets and the State Exposition building at Agricultural Park; by the Alta Planing Mill Company at Third and Hill, where a reinforced concrete office building is under construction, and by various other local contractors. It has become a familiar and recognized method of handling concrete in Los Angeles, where it originated. It is stated by the Concrete Appliances Company that all users of the gravity system without a license from the company and the payment of the royalty fees will be prosecuted to the limit for infringement.

Using the Gravity System

The gravity system for pouring concrete is being used in practically all the important concrete jobs now under way on the Pacific Coast.

The new Union League Club building in Los Angeles will be nine stories and the F. O. Engstrum Company is using the gravity system to facilitate greater speed, as it is desired to have the building ready for occupancy next March.

In the construction of a five-story reinforced apartment house for the Rampart Investment Company of Los Angeles, Architect Paul C. Pope has specified the gravity system of construction and the same system will be used in pouring the concrete for San Jose's new $150,000 hotel, illustrated elsewhere in this number of the Architect and Engineer.

Southern Pacific Co.'s New Depot, Tulare, Cal. D. J. Patterson, Architect

THIS cut shows the new depot now being built at Tulare and which is being faced with **"Golden Gate Sandstone" Brick** made of sand and lime at our **Antioch** factory. We also sold the Del Monte (white Monterey) sand, red brick and crushed rock for this building. ***Do you ever buy sand, rock or gravel in carload lots?*** If you need any sand, rock or gravel for any interior points such as Tulare, Fresno, Sacramento, Richmond, etc., let us quote you and submit samples, for we can not only ship from our Antioch pit but we are able to supply you from a pit in the San Joaquin Valley as well as a convenient point in the Sacramento Valley.
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Charges of Faulty Concrete Work

Declaring that the charges against his firm are false and refusing to accept the blame for faulty concrete work in the Denman school, San Francisco, J. J. Burke of Henning & Burke, contractors, has issued a reply to the report filed by Engineer Campbell of the inspectors' bureau of the Merchants' Association.

"We are in no wise responsible for the fireproofing," said Burke, "as the supervision of the work was taken entirely out of our hands by the inspectors who dictated, supervised and made themselves absolute masters of how it should be done."

Speaking of the trouble he had had securing materials, Burke said:

"Everything I bought was refused, except the water." For nearly six weeks efforts were made to satisfy the various inspectors which was impossible, because the inspectors of the board of public works and those of the Merchants' Association could not agree on the type of rock to be used. Finally work went on, but the Merchants' Association men declared that too much sand was put in the concrete mixture.

"Practical concrete men said that the concrete would not flow into the forms if it were any coarser, but Campbell went to Casey of the board of public works and persuaded him to use a mixture with less sand. In consequence it was so coarse that no practical man would doubt that it would result in a poor job."

As to the roof of the Sheridan school, Burke said the contract called for Ludovici tiles or equal. As the firm named has its works in Kansas, and as Burke had been instructed by the city architect to patronize home manufactories, he secured Carnegie tiles instead. These were on the ground for two months and were on the roof before the Merchants' Association found fault with them, he declared.

Hoyt Bros. Busy.

Hoyt Bros., the well-known Santa Rosa contractors, have the following public buildings under construction:

Orland Grammar School, Orland, Glenn County, Cal.; cost $30,000; Parker & Kenyon, architect and engineer.

Plumas County Hospital, Quincy, Cal.; cost $20,000; Parker & Kenyon, architect and engineer.

Livermore Carnegie Library, Livermore, Cal.; cost $13,000; W. H. Weeks, architect.

Pythian Castle, Newman, Cal.; cost $23,000, W. H. Weeks, architect.

Bank of Lincoln, Lincoln, Cal.; cost $16,000, R. A. Herold, architect.

Lincoln Union High School, Lincoln, Cal.; cost $29,000, Parker & Kenyon, architect and engineer.

First National Bank of Newman, Newman, Cal.; cost $25,000, W. H. Weeks, architect.

Dixon Grammar School, Dixon Cal.; cost $26,000; Parker & Kenyon, architect and engineer.

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Denver Company Opens Coast Offices

The Western Elaterite Roofing Company has recently established a coast agency with offices and warehouses at Oakland which will be the distributing point. The company is the original manufacturer of Elaterite products, and has no connection with other makers of so-called Elaterite materials. The method followed by the Western Elaterite Roofing Company is calculated to ensure satisfactory results to the property-owner, for the company lays the roofing, and therefore can guarantee results.

Elaterite roofing is put together on the same principle that is followed in reinforced concrete construction, being a solid body of cement, reinforced. The Elaterite cement, of which it is composed, is pliable, elastic, non-drying, insuring long life to the composition. The body of cement is reinforced with a heavy fabric center, and saturated wool-felt back.

Elaterite roofing is made in several grades: Duck Top, which is a watertight, noiseless, durable cover for porches, decks, roof gardens, balconies, and such places as are walked upon and subject to the use of chairs, etc. 6x Grade is reinforced with two layers of imported India burlap; weighs about 75 pounds per square, and is used on class A buildings. 5x Standard Grade is reinforced with one layer India burlap, and weighs about 65 pounds per square. This grade is used on class B and class C buildings and stands all tests that five-ply felt and gravel stands. The 4x Grade has one reinforcing layer of burlap, and weighs about 55 pounds per square. This grade is used on buildings of low cost, and for covering old shingle roofs, and is equal, in every way, to four-ply felt and gravel roofs.

The roof of the immense Auditorium, in the city of Denver, one of the largest roof surfaces in the United States, is covered with Elaterite roofing.

The company also manufactures a line of Elaterite preservative and cyanide tank paints, Elaterite liquid waterproofing and roof coating.

On the new residence of W. F. Kelly, illustrated herewith, more than five hundred square feet of Elaterite decking was used. Mr. A. J. Lupton is the general manager for the Coast, and Mr. F. M. Gilstrap is local manager.

Hart Heater Has Merit

The Hart Heater Company of Oakland was awarded the first prize at the State Fair at Sacramento for gas water heaters, and also the first prize for gas radiators for hot water heating. Mr. Hart, president of the company, was in charge of the exhibit, assisted by Mr. Schemp, the company's head salesman. Orders were taken for more than three hundred boilers at the fair, one San Diego house ordering forty.

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Annual Meeting of San Francisco Chapter, A. I. A.

The annual election of officers of San Francisco Chapter, American Institute of Architects, was held Thursday, October 20th. Two tickets were balloted upon, that headed by the present head of the Chapter, William Mooser, being elected. The officers for 1910-11 are as follows:

President, William Mooser.

Vice-President, G. B. McDougall.

Secretary-Treasurer, Sylvain Schnaitacher.

Trustees—Jas. W. Reid and Albert [illegible].

Claremont High School

Preliminary plans by Architect Robert H. Orr, First National Bank building, Pomona, have been accepted for a high school building at Claremont. Other architects in the competition were Norman F. Marsh, A. C. Smith and Webber & Smith, all of Los Angeles. The sketches drawn by Architect Orr provide for a main central building, containing classrooms, offices, laboratories, and an assembly hall. This is flanked on either side by smaller buildings containing the domestic science and manual training departments, and a gymnasium. Bonds in the sum of $75,000 have been voted, of which $55,000 will be devoted to the construction of the building.

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Cotton Bros. at Loggerheads with Oroville Trustees

According to the Sacramento Bee, Cotton Bros., San Francisco and Oakland contractors, have struck a Tartar in the Oroville Board of Trustees. The company has refused to stand by the sewer contract, which was awarded to it, claiming that it would be impossible to complete the work in four months and asking for ten months' time, and at the same time refusing to sign the contract. The Trustees have decided to remain firm, and if the contract is not signed, $6,000 in the form of a certified check, which was deposited with the bid as evidence of good faith, will be forfeited.

The two provisions to which the contractors objected were as to the method of payment and the time limit. The board refused to budge and held that the material must be all on the ground before 75 per cent of the payment be made. They felt that if such a contract was not demanded inferior material might be placed in the sewer system.

Government to Use Concrete for Barracks

General Leonard Wood, chief of staff at Washington, D. C., has given out that future barracks construction in the Philippines would be of a permanent nature and of concrete. It has been found that wooden barracks are expensive because they are subject to early destruction by the wood ant of that country.

The present plans for the Philippine division, approved by President Taft, are to build all army buildings of two-story concrete, single houses for field officers, double houses for officers of lower rank, and one building to house a battalion.

Change of Name

The Standard Engineering Company announces a change of name to Braun, Williams & Russell, Inc., mechanical engineers and contractors, with offices at 503 Market street, San Francisco.

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Parrott & Co., Pacific Coast distributers of Ceresit Waterproofing have received the following letter from Mr. A. Cooley, a Selma contractor, which speaks for itself:

Selma, Cal., Sept. 19, 1910.
Parrott & Co., San Francisco, Cal.,
Gentlemen:

Replying to your favor of the 12th inst., acknowledging receipt of my order for Ceresit, I beg to state that my principal output is concrete blocks, the rest of my products require no waterproofing. After trying and discarding others I purchased Ceresit of you and it is the only waterproofing material that has proven entirely satisfactory, for the purpose of waterproofing the facing of blocks to prevent internal moisture and efflorescence. It easily mixes with the cement. Yours truly, (Signed) A. COOLEY.

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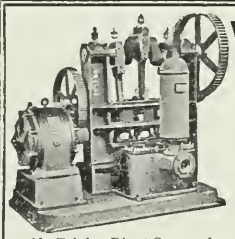

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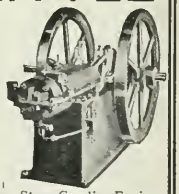

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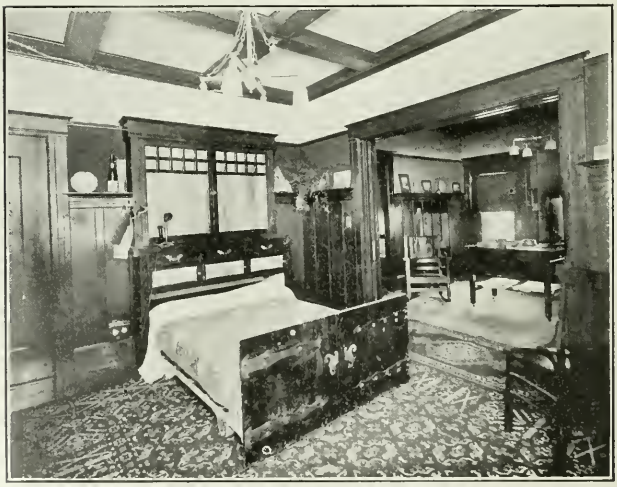
McRea Cottage, Alameda, Showing Holmes Disappearing Bed Closed



McRea Cottage, Alameda, Showing Holmes Disappearing Bed Down

The Disappearing Bed a Modern Utility

MODERN building requirements have advanced to the point where every available inch of space must be utilized, in order to ensure the owner a reasonable rate of interest on his investment.

Some of the brightest minds of the present generation have striven to solve the problem of how to eliminate waste space in a building, yet preserve the architectural and the artistic features. One of the most successful inventions, in this line, is the disappearing bed, the use of which enables the designer to provide for roomy closets, or dressing rooms, without sacrifice of floor space, and increased cost of building. The Holmes disappearing Bed Company has succeeded in producing a bed which is installed in hotels, apartment houses and flats, and which fills every requirement, including that of cost. It may be used in combination with a buffet, a dresser, a book case, a desk, a settee, and also with mantel effect. For hotel use it is commonly combined with a dresser, or with a writing-desk. In apartment houses, the disappearing bed is installed with furniture combinations appropriate for living rooms and dining rooms.

The accompanying cuts show the Holmes disappearing bed in use in the McRae cottage, Encinal avenue, Alameda. To publish a full list of the buildings that have been equipped with these beds would require too much space. Among the San Francisco apartment houses thus equipped are the Zenobia Apartments, Richelieu, Casa Madrona, Fordham, Charleroix, Lindo and Matabelle; and the St. Nicolai, Llewellyn, Wallendale, Lucerne, Lakeside, Annabel and Casa Rosa apartments in Oakland. The hotel being built for the Wall estate, on O'Farrell street, near Powell, and the new hotel for Wm. Wilson, on Stockton, near Sutter, in San Francisco, are equipped with the Holmes disappearing bed.

At the Alaska-Yukon-Pacific Exposition, three grand prizes were awarded the manufacturers of this bed, as follows:

1. A disappearing bed that is perfectly concealed.
2. Sanitary condition; self-airing.
3. Economy of space and elegance.

The offices of the Holmes Disappearing Bed Company are at 687 Monadnock Building, San Francisco, and the show room is well worth a visit, to the owner of property and prospective builder.

Good Waterproofing

Those interested in the subject of waterproofing are invited to write the K. C. T. Waterproofing Company of Los Angeles or any of their agents, regarding Imperial Waterproofing, which is being so successfully used under the most exacting conditions.

The most thorough and exhaustive tests by architects and engineers have proven its efficiency and adaptability to any demand a waterproofing might be called upon to meet. The results obtained on the elevator tunnel in the Los Angeles court house have been most gratifying. The basement of the Chamber of Commerce at San Bernardino was finally waterproofed with Imperial waterproofing by the A. F. George Company of Los Angeles and is now being occupied by a drug store with perfect satisfaction. The Imperial product is also being used on such works as the large siphon of the Los Angeles aqueduct, the Higgins building in Los Angeles and the Raleigh hotel in Seattle.

Imperial waterproofing is a liquid, can be mixed in with the cement or applied to the surface with a brush. It is adapted to use on brick, cement, plaster, tiling, stone, etc. It contains no oil or grease of any kind, is a chemical solution, not a mixture and is practically indestructible. It does not discolor the material to which it is applied but may be made any color desired by the use of pigments. It penetrates the material to which it is applied, filling the pores and protects it for all time.

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Concrete Piers for Railroad Tunnel

A new departure in tunnel repairing is being made by the Nevada County Narrow Gauge Railroad Company in repairing the large tunnel at Town Talk, between Grass Valley and Nevada City. The large timbers used when the tunnel was first erected in the late 70's have become badly rotted and in their place piers of cement are being put in. An exchange says: "A man from Los Angeles first conceived the idea, and he will try to interest the mining men in the hope that cement will later take the place of timbers in the mines. The cost is a trifle more at first, but when it is considered that cement will last a lifetime, it will prove cheaper in the end."

Southern Pacific's New San Francisco Ticket Office

With the opening of the new Southern Pacific ticket office in the Palace hotel, at Market and New Montgomery streets, San Francisco is able to boast of the finest ticket office in all the West, if not in the whole country. The company has spared no expense in either furnishings or equipment, and has introduced many features that mark an innovation in caring for the interests of the traveling public.

Instead of the usual wall counters there is one center circular counter with wide spaces the whole distance around to accommodate ticket buyers. The great room has 3,500 square feet of floor space, is lighted both in Market and New Montgomery streets with large plate glass windows and is finished in Circassian walnut.

The most novel feature of the office is the immense map of the United States, painted in colors upon the western wall of the room, work on which has cost over $4,000. The map, unlike a great many railroad maps, is geographically correct, and is six and a half miles to the inch.

The wall ticket cases, which have been a familiar feature of railroad offices for so many years, are conspicuous by their absence. In this office the passenger will tell his wants to the clerk behind the counter, who will write a memorandum upon a slip of paper, drop it in a pneumatic tube and a few minutes later the same pneumatic tube will supply a ticket over the desired route and with the proper number of coupons to the passenger's destination. The tickets no longer resemble the tail of a kite, but are now much smaller and constructed on the accordeon plan.

The walls are beautifully decorated with immense photographs of California scenery designed to advertise the State's attractions to strangers.

Move to Mills Building.

The Bexhill Window Company has moved its offices from the Foxcroft building to the Mills building, San Francisco, where more pretentious accommodations have been secured. The company's patent casement window is being generally specified by architects for both business houses and residences. Some idea of the appearance of the window when erected may be had from the photograph of the Gray building on Mission street, a cut of which appears in the company's advertisement in this issue.

SOMETHING ENTIRELY NEW

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When writing to Advertisers mention this Magazine.

Section of the Ione Sandstone Quarries, Amador County, California

Pure White Sandstone—A California Product.

In the United States geological reports some twenty years ago notice is given of a ledge of pure white sandstone in Amador county, California.

The remarkable feature of the case is the fact that nearly twenty years have elapsed before this ledge was developed, and the product placed upon the market as a commercial proposition by the Ione Sandstone Company, with offices in the Ochsner Building, Sacramento.

Both white and red sandstone are quarried by the company, the red sandstone being a bright salmon color. The crushing strength of the white stone is from 4000 to 6000 pounds per square inch, and that of the red stone is 1200 pounds.

The stone is easily carved when first quarried and like all sandstone, hardens on exposure to the air.

The California National Bank of Sacramento was constructed of red sandstone from this ledge in 1889 and the new addition to the building now in process of erection is of the same material.

The State Reformatory at Ione is also built of Ione sandstone, and the Crocker National Bank building of San Francisco shows the red sandstone from this ledge.

At present the demand is for light-colored stone, for building purposes and the white sandstone quarried by this company is lighter in shade than any stone produced in America or in foreign lands of suitable strength for building purposes.

The company has uncovered about 110,000 tons of the white sandstone which combines all the qualities of French Caen, Utah Manti and Bedford stone, and are prepared to ship it in blocks up to 40 feet long.

A comparison of this stone with other white sandstones will convince the investigator that for color and crushing strength, Ione sandstone is entitled to the first rank.

Derrick at Work in the Ione Sandstone Quarries

THE CHEAPEST REINFORCEMENT AND BEST

The superiority of the Kahn Trussed Bar has never been questioned, so that we can say "cheapest" and be understood. Considered strictly from a dollars-and-cents standpoint you are losing money by buying any other bar. Remember that in the Kahn Trussed Bar the shear members are formed from the flanges of the main bar which are ordinarily wasted,—that you save all of the expense of handling a large number of loose stirrups — that you secure absolute safety and strength against fire, shock or careless workmanship, — that rigid connection makes beams 20% stronger.

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KAHN TRUSSED BARS

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Hy-Rib, a self-centering reinforcement for Roofs, Floors, Walls, Partitions and Ceilings; **Rib Metal**, for Conduits and Slabs; **Built-up Column Hooping**; **Cup-Bars**, Straight or Bent; **Rib Lath** and **Rib Studs**, for Plaster and Stucco; **United Steel Sash** for Fireproof Windows; **Trus-Con Products**, for Waterproofing and Finishing Concrete.

Write for catalogues or call upon one of the men listed below.

Trussed Concrete Steel Company

689 Trussed Concrete Building, Detroit, Michigan

KAHN SYSTEM Reinforced Concrete

SAN FRANCISCO, Felix Kahn, 304 Macdonough Building.

LOS ANGELES, J. E. Heber, 703 Central Building.

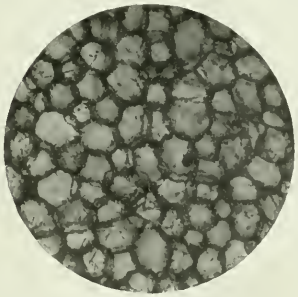
PORTLAND, ORE., J. A. Currey, 1009 Board of Trade Building.

SEATTLE, WASHINGTON, Arthur Nelson, 14 Downs Bldg.

Good Refrigerator Insulation

Do you realize its importance?

Good insulation will keep your ice bills down. Fine hardware and beautiful cabinet work won't. Better cut some of that out, if necessary, and get a plainer box insulated throughout with two or three inches of



Nonpareil Corkboard under microscope, showing sealed air cells.

NONPAREILL CORKBOARD

It costs a little more than make-shift insulation — air-spaces, mineral wool, charcoal, paper, etc. But think of the advantages—you save ice—you get a lower temperature—you get an absolutely sanitary cooler—your box lasts longer.

The reason? Simply because Nonpareil Corkboard is not fibrous or porous like the other materials mentioned, but cellular—just a mass of tiny sealed air cells.

Heat has a hard time getting through. Moisture can't get in at all. Hence, there is no rot, no mold, no offensive odors, no deterioration whatever.

If your dealer can't supply coolers insulated with Nonpareil Corkboard, or if you want to build your own cold storage rooms, write us.

ARMSTRONG CORK COMPANY, Insulation Department,
625 Third Street, San Francisco

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GEO. A. MESICK.
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The Soule Reversible Window

The Soule Reversible Window Company has established permanent offices in the Maskey building, San Francisco, and is offering to the building public a variety of reversible windows which, for simplicity, effectiveness and durability, are said to excel many other makes. The manufacturers say their windows are particularly easy to operate in opening and reversing, and are absolutely weatherproof. The windows are made with both single and double casement sash, some of the special advantages of the casement sash being the following:

Cleaned in one quarter of the time it takes to clean a window in the ordinary way.
A child can do the work.
No danger or risk of falling.
No settlement or racking of sash.
Always in working order.
No pulleys or weights to supply.
No sash cords to wear out or break.
In cleaning does not expose cleaner to public view.
No pocket room for weights required.

Other makes handled are the casement pivoted sash, hung and counter-balanced sash and finger-grip sash. Working models of the different devices are on exhibition at the company's offices, and architects, owners and builders are cordially invited to call and inspect.

Selling Agents for Metal Windows

The L. A. Norris Company, Alaska building, Portland, has been appointed selling agents for Washington, Idaho and Montana for the Cizek metal window frame and also the Cizek pivoted sash metal window, patented, owned and manufactured by the A. F. Cizek Sheet Metal Works Company. This patented pivoted sash is the only one on the market that operates without a spring.

Effective Sprinkler Systems.

The Pacific Fire Extinguisher Company, San Francisco, Seattle, Portland and Spokane, has received a letter from the McGoldrick Lumber Company, Spokane, in which credit is given to the Pacific fire sprinkler system for checking a fire in the shaving vault of its planing mill. This is only one of several instances where serious loss has been prevented by the automatic sprinkler system.

Announcement

Myron Hunt and Elmer Grey, Los Angeles architects, announce the dissolution of their partnership. Mr. Grey has taken new offices in the Wright & Callender building. Mr. Hunt will continue his practice in the Union Trust building, Los Angeles.

Interior of Banking Room, London Paris National Bank, San Francisco
Albert Pissis, Architect

Plain and Ornamental
PLASTER Work

BY

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& Manetta

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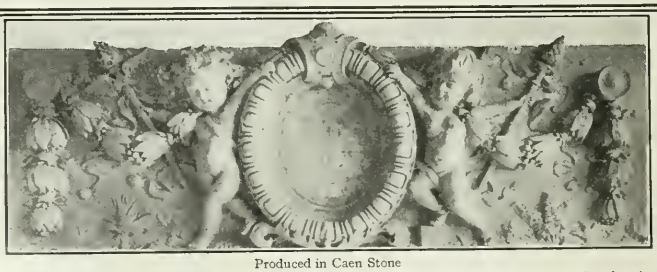

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